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Increasing Revolving Ferrous Scrap Fund

Permanent Loss of Iron Reserves Pointed Out—Importance of Scrap for Steel Manufacture—Effect of Imports of Scrap or Ore

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WAR taught the necessity of iron, not only for the advance of civilization, but also for its protection and its potency (in the hands of the Germans, for its destruction.) Because of this, 75 per cent of the iron reserves of Germany have been given to France; this is probably the most important restriction placed upon Germany. If France can secure sufficient good coking coal, which is doubtful, or develop her hydroelectric power, of which she has more than any other European country, about 6,200,000 hp., and succeed in converting these ores of Lorraine annexée electrically (she now has 69 electric furnaces), France may become second only to the United States as a producer of steel.

The United States is divesting itself rapidly, permanently, of its iron reserves. This is a more important consideration than the other vastly important question of the quick exhaustion of its oil reserves, which can be conserved by substitutes, as oil shales, coal and hydroelectric power. The iron ore reserves, of grades now used, are estimated to last only two generations; this reserve will go into scrap, but there is an estimated annual permanent loss of upwards of 20,000,000 tons of iron ore, of 50 per cent iron content.

Production and Sources of Scrap

Ferrous scrap is produced by discarding or rejecting iron and steel in process of manufacture, and by gathering, preparing and grading old or disused iron and steel products. It is "secondary metal" as distinguished from "primary metal," smelted from ores. It has a higher Fe content than pig iron, has been converted and refined and is cheaper than pig iron.

During the war every effort was made to gather it. As the larger producers of scrap know its value and carefully sort it, the War Industries Board found that the total supply could be increased only by inducing the farmers and town people to gather their scrap; the Red Cross and other agencies made a patriotic appeal to the people to cooperate in this. There are no reliable statistics of the total domestic production of scrap; by a formula, described below, the 1919 production is estimated to have been about 18,000,000 tons.

Our scrap imports are small, amounting in 1913 to 41,512 tons and in 1918 to 65,693 tons. Steel making countries, which are the largest producers, use their own scrap, so there is not a large tonnage available by importation to replace the exhaustion of our iron reserves, estimated to be about 10,000,000 tons a year. The large scrap producing countries, other than the United States and Canada, are across the Atlantic, and all large producers of scrap are also large users of it. Our imports are mostly from Canada (1913, 26,333 tons; 1918, 45,518 tons). Exports from the United States are mostly to Canada and Italy (1913, 102,201 tons; 1918, 22,385 tons); both these countries lack pig iron.

The scrap industry is an important factor in the conservation of iron ore, coke and limestone. As the annual turnover of scrap increases, less pig iron is needed, and consequently less blast furnace, coke oven and quarry capacity, and less transportation facilities are required. The importance of the last mentioned saving is seen from the fact that transportation costs on raw materials per ton of pig iron have increased from $4.79 in 1912 to $10.55 in 1921. A ton of scrap may replace a ton of pig iron, which is made of two tons of iron ore, a ton of coke and half a ton of limestone, or 3½ tons, approximately.

Common Uses of Scrap

As 50 per cent or more of the charge of the open-hearth steel furnace is scrap, its importance as a raw material is high, becoming more so as up to 100 per cent of the charge of the electric steel furnace may be scrap. Scrap is also used in blast furnaces and chemical works; and, without melting, by rerolling, forging and stamping and by piling and rolling into bars of iron. Pig iron can be made from scrap in the blast furnace and the electric furnace by adding carbon and silicon. Cast iron scrap is practically pig iron, and is remelted simply in the cupola for castings.

Wherever scrap and electric power can be obtained, the highest grades of steel can be made, even from low grades of scrap, as the electric furnace process is wonderfully refining, eliminating not only phosphorus, but sulphur. Steel can be made, in the absence of iron ore or coke, by utilizing scrap in the place of pig iron and substituting electric power for coke and gas coal, or oil. A nation with cheap electric power, hydroelectric preferably, can become a steel producer, competitively, even though it possesses no iron ore or coal; once possessed of large tonnages of iron and steel in place, in the form of equipment and structures of iron and steel, a country may support a considerable steel industry on the continual reclamation of scrap.

As the conversion of scrap into steel involves an oxidation loss of some 3 per cent, and since in the long run 95 per cent only of the steel is recovered as scrap, a persistent depletion of some 8 per cent occurs. These losses are increased by exports of iron and steel, the scrap from which is not returned by countries manufacturing steel, their production being largely based on the scrap supply, for which there is competition.

Quantities of Scrap Recovered and Consumed

Statistics of domestic recovery and consumption of scrap are incomplete; by a formula explained below, the following estimates are arrived at:

	1910	1913	1916	1918
Tons	8,846,816	9,742,000	15,854,588	18,372,773
Value		$109,104,000	.....	$551,183,190

To arrive at these figures it is necessary to take

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into account the oxidation of carbon and silicon in the pig iron and of iron in the conversion into steel; taking these losses into consideration a formula may be used to estimate the scrap supply approximately. The formula is: 103,092 per cent of the steel made, minus the Fe in the Bessemer and basic pig iron made, equals 85.5 per cent of the scrap supply. The remainder, 14.5 per cent, represents rolled and rerolled iron. This formula gives a scrap total for 1916 of 15,854,588 tons. The formula is based on the figures for one year only.

Efforts are being made to obtain other figures, with which to revise these estimates of scrap production. It is understood that the figures of exports and imports enter into this, but as the average ratios for years 1910-1918, of exports to production is 0.65 per cent and of imports 0.55 per cent, a difference of only 0.1 per cent, it is felt that until needed figures are obtained and a revision of estimates made, the present estimates can be used as fairly informative.

Oxidation Losses Requiring Neutralizing

Under the head of oxidation: the Bessemer process is highly oxidizing, as it blows compressed air through molten iron; iron losses, in the atmosphere and in the slag, may be conservatively stated to be from 3 to 6 per cent. The puddling process loses 5 per cent of iron in the slag as oxide. The open-hearth process loses 3 per cent of metallic iron, as iron oxide in the slag. There are iron losses also in heating furnaces and from weathering. An average of 3 per cent loss by oxidation, applied to the tonnage of steel output, is taken as a conservative figure. Pig iron losses are approximately 5 per cent by oxidation of carbon, silicon and manganese.

The excess of exports of iron and steel over imports in 1917 was 5,779,474 tons. The year of largest production is used, because the steel business is increasing, and it is felt that figures based thereon do not overestimate future conditions of the industry.

Imports of scrap in 1917 nearly balanced exports, being 223,834 tons for the former and 238,666 tons for the latter. Imports of machinery, cutlery, tools, etc., although a part of the consumption, are not taken into account, as total tonnage figures are not available and the amount is but a small fraction of the total steel production.

Calculation of Permanent Losses

The total permanent annual loss of iron (Fe) may be stated as follows:

	Tons
3 per cent of 46,978,364 tons* (oxidation loss)	1,407,850
5 per cent of 47,011,358 tons† (not returned)	2,350,567
Exports less imports	5,779,474
Total estimated permanent annual loss	9,537,891
Equivalent iron ore (50 per cent iron content)	19,075,782

The steady reduction of iron reserves of the United States may be judged from the above estimate. The increase of production of scrap, estimated, by the formula given above, more than doubled in 8 years, being in 1910, 8,846,816 tons, in 1918, 18,372,773 tons.

Scrap Formerly Held in Low Esteem

In the early days of the iron industry there was a remarkable disregard of the value of scrap, the old iron works paying little attention to anything but the hammered bars, which passed current almost as coin, in Virginia, at 6c. per lb. During the past generation, old slag dumps of charcoal iron works have been used in blast furnaces, having been found to contain much metallic iron of pure quality, as well as iron oxide, which made this material more valuable than iron ore. The great use of scrap began with the rapid development of the open-hearth process, about 1890; the scrap business has grown to large proportions with the growth of the basic open-hearth process, particularly.

Scrap Production Vastly Increased During War

The war produced vast amounts of scrap, not only by destruction and wear but in process of manufacture. The average rejection of shell steel at the steel mill before forging and machining was 42 per cent for rolled steel and 22 per cent for cast steel. These percentages of rejection are interesting, as the cast steel slugs were made in inverted, hot top molds, the riser, or hot top, being practically the total rejected steel. This is a strong argument in favor of the inverted, hot top mold. The percentage of steel in the hot top (over 20) should be noted, as only 10 per cent is allowed in some works experimenting with this type of mold.

Turnings of guns and shells were a large item of scrap production. Blast furnaces used up to 100 per cent of these fine turnings, and open-hearth furnaces increased the percentage of scrap up to 75 per cent, and even in one case to 90 per cent. But fine scrap turnings and borings are liable to rust and admixture of dirt, and are hence not desirable in the open-hearth furnaces, and they are of unknown composition. To meet this the use was advocated of high manganese pig iron for high initial and residual manganese in the steel bath.

Alloy steel scrap is increasing and is valuable, but requires expert preparation and use. The unknown percentages of nickel getting into the scrap supply, particularly from the Cuban ores, is troublesome to the crucible steel makers, who use purest scrap, as the process is not a converting or refining one as are the others, particularly the electric process.

An interesting use of steel scrap in the blast furnace in a high phosphorus iron ore section is the making of Bessemer grade pig iron from basic open-hearth steel scrap, for ingot molds, to save high transportation costs. Wrought iron scrap is valuable, as it is fibrous and is made into bar iron, by piling, heating and rolling. Because of its crystalline structure, steel scrap is not permissible in the higher grades of bar iron.

Where the Scrap Comes From

About 20 per cent of the scrap supply is "country scrap," miscellaneous iron and steel gathered from towns and farms by peddlers and traders into scrap yards, where it is sorted and prepared for use by scrap dealers. About 25 per cent of the scrap supply is "railroad scrap," carefully gathered by the railroads, and graded and sold to dealers and consumers; some of it is made into bars, bolts, etc., by the railroads for their own use. Some 30 per cent of the scrap is "industrial scrap" made in works and rejected in processes of manufacture, such as crop ends.

Much scrap never comes on the market, being returned to the furnaces and remelted by the works making it. So well do the works appreciate the value of scrap in these days that slag dumps are hunted through for it. As scrap losses show in the monthly cost sheets, the manager endeavors to reconvert his scrap monthly.

It would be well if the country at large would take this view of the scrap question. The possible permanent exhaustion of domestic iron reserves at the rate of 10,000,000 tons a year, which doubles (Hewitt's formula) every ten years, and which will increase with the world need of our steel and the efforts being put forth by increased export agencies, merchant marine, etc., calls for constructive suggestions for its replacement. If an amount of scrap equal to the losses of iron could be imported, the remedy would be easily found, but this cannot be expected, so consideration must be given to the iron ore supply.

Use of Vast Reserves of Low Grade Ores

It is argued that the immense reserves of low grade iron ores can be utilized indefinitely, but the question arises: "Can the United States maintain the comparative advantage in the manufacture of steel by using iron ores that require expensive beneficiation, or extra fuel, flux, labor and transportation charges with lessened furnace production?" It is an axiom with blast furnace men that high grade iron ore produces high grade, low cost pig iron and large furnace output, and low grade ores the reverse.

Very pure ores need low grade ore to increase the slag, for good furnace working and to carry off the sulphur from the coke and limestone and ore. Large

*Ingot production, figured "up" to allow for oxidation, which, when deducted, leaves the net production.
†Same as above, with wrought iron added.

numbers of blast furnaces are located near coke and flux and some low grade iron ores, by which hundreds of empty coal cars are returning daily from the Atlantic ports, which could bring back cheaply as return freight imported iron ore.

If all the world were using low grade ore or ore concentrates, no doubt the United States could use low grade ores, but a study of the iron reserves of the world shows that there is a vast reserve of pure iron ore in Brazil that is barely touched, and which the Germans looked to before the war, and the English are now planning to develop on a large scale, by building modern ore ships, docks and railroad and mining equipment.

Ore Imports as Offset to Scrap and Oxidation Losses

If Brazilian iron ores can penetrate to the Pittsburgh district, about 30,000,000 tons of Lake ore would be released annually as a reserve for the middle West, to which the center of population and of the steel business is drifting. The by-product coking coals of West Virginia and Kentucky, a wonderful field of low sulphur, low ash, low cost coals, meet at the Lakes the Lake ores, which are almost automatically discharged into blast furnaces, at which are located by-product coke ovens. All the Lake ores are needed to match these coal reserves, and the growth of the United States will absorb the steel made from them.

Imports of Brazilian ores would obviate the long rail haul on Lake ore to the Eastern steel works, and replace our losses of iron reserve and place these works in position to export the higher grade steel, for which there is the necessary skilled labor, trained for a century. Exports of steel under these conditions would not be a detriment.

Urged to Buy Coal Now

WASHINGTON, July 26.—Warnings to consumers of bituminous coal again are being sent out by the Government, urging them to lay in their supplies now, in order to prevent a shortage this winter, due to the lack of cars or other conditions. Recently, the Interstate Commerce Commission sent out notices to this effect to public utility organizations and a similar appeal has been subsequently issued by the Secretary of Commerce. Mr. Hoover says that there is every indication that there has been an undue slackness in the purchase of coal which may accumulate to large demands in the autumn. He expressed the conviction that due to the general depression in the prices of bituminous coal at the mines, it is not too high at the present time, in fact, he was of the opinion that numbers of operating coal companies are making no profits whatever.

"If there should be a recovery of business activities in the autumn, taken in conjunction with the large increase in percentage of disabled cars (from 5 per cent to 16 per cent during the past six months) and the inability of the railways to finance their maintenance, there are possibilities of development of a most serious situation as regards coal movement," Mr. Hoover stated.

Ladd Metric System Bill

WASHINGTON, July 26.—Efforts are being made by Senator Edwin F. Ladd, of North Dakota, to have the Senate Committee on Manufactures conduct a short hearing at the present session on his bill, providing for the compulsory adoption of the metric system. After the convening of the regular session in December, he hopes to reopen the hearings and go into the matter at length. Present indications are, however, that no hearings will be held at the present session. Senator La Follette, of Wisconsin, chairman of the committee, has stated that he is favorable to the granting of the hearing but doubts that it would be possible to secure the consent of any three members of his committee to act as a subcommittee to conduct the hearings. It is the opinion of Senator LaFollette that there is other legislation now before Congress which he considers to be of greater importance than the so-called metric system bill, and he is unwilling to undertake the conduct of the hearing personally.

SALES STOPPED

Step Toward Central Bureau for Sale of Government Surplus

WASHINGTON, July 26.—Pending the establishment of co-ordinating machinery for the supervision and control of all Government sales of surplus material, Director of the Budget Charles G. Dawes will continue in force the order issued by him last Thursday, stopping all sales of this kind, with the exception of perishable property. The order carries no particular significance so far as it concerns surplus quantities of steel held by different branches of the Government, as there have been no important sales attempted recently, and the Shipping Board, which has the greatest bulk of surplus steel, amounting to some 300,000 tons, recently stopped all sales. The other branches having sizeable tonnage are the War and Navy Departments, whose combined total of surplus is estimated at not over 40,000 tons.

The order, however, derives most interest from the fact that it is the entering wedge to some form of a centralized bureau for the sale of all Government surplus property, though it may be of a general character with given branches of the Government still in control as to certain details with regard to the disposal of materials. Lack of co-ordinating control, according to General Dawes, has resulted in large and currently accruing loses to the Government and it is the purpose of the Budget office to absolutely check this loss until the machinery for supervising the sales can be formed.

Building material, steel, cement, lumber, furniture, ships, automobiles, textiles, food supplies, buildings, etc., said General Dawes, are owned by the United States and available for current use. It is the purpose to have a central body to supervise the sale of this material.

"In the face of a large supply on hand," his order to department and bureau heads said, "because of the lack of a co-ordinated control and system of survey, with facilities for bringing to the knowledge of all departments the requirements of each, the different departments of the Government have been buying different classes of material in the open market with little recourse to stocks on hand.

"The cause of this situation, while it is primarily due to the lack of co-ordinating machinery of supervision and control, is aggravated by the delay on the part of the different departments in declaring as surplus certain property unnecessary to their purposes. It is also aggravated by the delay in the preparation of inventories which are now incomplete."

Preparing to Increase Output

The Athol Machine & Foundry Co., Athol, Mass., vises, is readjusting its production machinery with a view to increasing output 150 per cent when business conditions warrant. Approximately two dozen machine tools, including large drill presses, have been discarded and a broaching machine and two other less important pieces of equipment purchased. Various machines are being placed in batteries, and in sequence, according to required machining operations. A modern tool crib has been installed on the second floor of the plant, and a large number of jigs and fixtures made. In addition, a new stock department has been established, all patterns have been redesigned, a new directing head secured for the foundry department and heat treating and oil tempering equipment installed. The company's entire line of vises has been revamped and standardized and all parts made interchangeable and in other respects improved. New products also are being placed on the market. S. F. French, general manager and superintendent, has been succeeded by H. R. Linton.

During the first six months of 1921, industries at Youngstown, Ohio, disbursed $29,458,814 in wages, as compared with $45,923,170 distributed during the corresponding six-month period of 1920. The June payroll of $3,764,116 was $283,425 less than that in May, and compares with $7,723,830 in June of 1920.

NEW ROTARY GRINDER

An 8-in. rotary surface grinder has been brought out by the Pratt & Whitney Co., Hartford, Conn. The machine is designed for grinding disks, rings and cylinders requiring flat and parallel surfaces and is provided with sensitive adjustments for the rapid production of gear blanks, washers, cutter hubs or other work requiring close accuracy. In addition, it is provided with means for grinding concave or convex surfaces.

The machine is regularly arranged for belt drive, with idler pulleys equipped with double ball bearing mounting. The main driving pulley is 26 in. in diameter, taking a 4 in. belt, and the tight and loose pulley, 16 in., taking a 6½ in. belt. The speed of the countershaft is 450 r.p.m. A 7½ hp. constant speed semi-enclosed motor running at 1800 r.p.m. can be furnished if required in which case the motor is mounted on an adjustable base and a spring idler provided to automatically tighten the driving belt.

Starting and Stopping of the Chuck Is by Foot Pedal. Lever control similar to that used on drill presses provides sensitive control of the wheels. The steel guard around the wheel is adjusted to leave about ¼ in. of wheel exposed

The main drive shaft is mounted on radial ball bearings and the chuck driving clutch equipped with a ball thrust bearing to take the load at this point. A secondary shaft, carrying a chuck driving pinion and sliding two-speed gears is mounted on bronze bearings and equipped with a flexible coupling to take care of chuck tilt and alignment. The entire mechanism runs in oil, the bearings being lubricated by splash.

The spindle is mounted on ball bearings amply lubricated and protected from dirt and moisture. Means for eliminating end play are provided and adjustments for wear can be made. The wheel is 8 in. in diameter, 3 in. high, has a rim ⅝ in. thick, runs at 2000 r.p.m., and is mounted on a holder in a manner to facilitate easy mounting and changing. Two mounts are furnished. A safety band is clamped around the wheel which is again surrounded by a steel guard, adjusted to leave about ¼ in. of the wheel exposed when grinding. As the wheel is raised to the idle position the guard automatically covers the wheel so that the work on the chuck can be handled with safety. The guard is adjustable for wheel wear.

Lever control, similar to that used on drill presses, gives sensitive control of the wheel when grinding and an easy quick movement to the upward or idle position is provided where liberal clearance under the wheel is allowed for handling work. A positive mechanical stop is provided to grind to specified thickness when the lever feed is used. Finer adjustments for wheel wear and varying thicknesses are made by hand wheel graduated to 0.0002 in., operating through a worm and wheel. The hardened points of this stop are so positioned that the backlash in the worm and wheel is neutralized and the wheel and slide are overweighted in order to obtain very close accuracy. For certain classes of work the lever may be locked in position and the hand wheel for finer adjustments used as a feed wheel instead, in which case one turn of the hand wheel feeds the grinding wheel down 0.05 in.

The rotary magnetic chuck is 10 in. in diameter and is arranged for two speeds, 50 and 100 r.p.m., to take care of variations in the diameter or physical characteristics of the material ground. The chuck can be tilted a maximum of 2 deg. for convex or concave work, a graduated dial on the outside of the guard indicating the amount of tilt in minutes. The maximum longitudinal adjustment brings the chuck center 1 in. beyond the outside diameter of the wheel. The center of the chuck is bored to receive a safety wheel dresser or a centering plug used when grinding washers.

Starting and stopping of the chuck is controlled by a foot pedal on the right side of the machine, leaving the operator's hands free, and a brake operated automatically by the foot pedal rapidly retards the chuck rotation. The magnet current, 110 or 220 volts direct current, is controlled by a switch on the right of the machine. The switch also acts as a demagnetizer.

A pump and piping convey the cutting lubricant from a tank within the column to the inside of the wheel, the volume of flow being regulated by valves. In addition, a hose is provided on the outside for washing the work and the chuck. Access to the tank for cleaning purposes is provided through a sliding settling pan located in front of the column. The flow of cutting lubricant ordinarily is controlled by the movement of the feed lever, which automatically turns on the water when grinding or shuts it off when the wheel is in the work handling position. This control may be disconnected by a simple pull knob, allowing hand operation of the water supply. The spray is confined to the table by a cast guard, the front section of which can be dropped by releasing a pull knob, thus giving additional clearance while handling the work.

Cost of Living Almost Stationary

July figures of the National Industrial Conference Board, 10 East 39th Street, New York, show that the cost of living for the month is 61.6 per cent above the corresponding figure for July, 1914. Last month the excess was 61.9 per cent, while July of 1920 showed an excess of 104.5 per cent. Rent and light are both above the figure for last year, food and clothing are both far below the figure for last year, fuel and sundries have shown practically no change.

Arthur G. McKee & Co., Cleveland, have completed the erection of a five-unit Kling-Weidlein dry gas cleaner for the Shelton Iron & Steel Co., Stoke-On-Trent, Staffordshire, England. This is the first Kling-Weidlein Gas Cleaner to be erected in England.

Wages in the British Steel Industry

War Advances Were Large, but Readjustments Are Now in Progress—Not Many Employees Were Reduced Before April—Workers Still Limit Output

BY PAUL M. TYLER*

AFTER more than six years of steadily advancing wages, Great Britain has entered on a period of readjustment that must inevitably result in a nation-wide reduction in the earnings of her workers. While it is doubtful if wage rates reached an unwarranted level during the period when commodity prices were at their peak and the whole world was clamoring for goods, the pendulum swung too far and liquidation of labor prices was delayed well into the period of industrial depression that swept over the world during the late months of 1920. Whereas the prices of raw materials in England reached their highest level in February, 1920, and the cost of living attained its maximum at the end of October, wages generally continued to increase until January. Except for those trades in which there is regulation by sliding scale agreements under which wages fluctuate according to the Ministry of Labor index number of retail prices and rents, or according to the prices of the product, comparatively few workers suffered any reduction in their nominal earnings up to the end of April.

Many Idle Workers

Even prior to the coal strike, unemployment in the British Isles had reached alarming proportions with the result that the total earnings in many important trades were greatly reduced. Unfortunately, however, this situation did not result in any considerable pressure upon the nominal wage levels. This condition is attributable to various causes, among which may be mentioned the granting of unemployment doles and the organized resistance of the powerful national unions. In certain cases labor contracts are still in force which prevent an early readjustment to meet the needs of the present situation. The payment of unemployment doles—amounting in the case of a single man to 20s. a week—removes the argument of the hungry stomach and the mass of unskilled workers consider that if they accept employment, they are working only for the difference between the wages which they get and the dole they would receive without working at all.

The attitude of the labor unions is clearly indicated by the stand taken by the coal miners, who refused to work except on condition that a national wages board were set up to facilitate collective bargaining with their employers and earnings under time rates for about 30 hours' work a week that will maintain an even higher standard of living than they enjoyed before the war on the basis of a full week. While there is a real need for improvement in total earnings of British workers as compared with pre-war standards, even in the event that the cost of living should return to the same levels, the workers and particularly their leaders are still consistently refusing to make up the difference by increasing efficiency. "Ca' canny" or the deliberate restriction of output is the persistent policy of a large group of British workmen and the wage cost of many commodities is due more to slack performance on the part of the workman than to the daily or weekly wages being high. The fallacy of British labor's economics has been urged persistently by the employers' associations and the press during and since the war and some progress has been made among the more intelligent classes of workers, but the theory that there are not enough jobs to go around is too firmly imbedded to give way easily in spite of the fact that from one-third to one-half of all the products of British industry must be sold abroad in competition with those of other countries whose standards of living are lower or whose methods of production are more efficient.

Cost of Living

In considering the probable readjustments in general wage levels, it is necessary to give some attention to the cost of living. The Ministry of Labor publishes a figure monthly which purports to represent the "increase in the cost of maintaining unchanged the average pre-war standard of living of the working classes." This figure does not strictly represent the actual increases in expenditures of the average family owing to the fact that variations in the amounts of increase in the prices of different commodities have tended toward the purchase of different proportions of some of the items included in making up the index and because the standard of living has been raised in many families whose earnings have been increased in greater proportion than prices. These figures, however, are probably more representative than any others that can be readily obtained of the general increase in the cost of living in England since 1914 as they include allowances for food, rent, clothing, fuel and light, and miscellaneous items.

A tabulation of the above index number indicates that the cost of living in England increased gradually but steadily from a few months after the outbreak of the war until the armistice, when it was 120 per cent above the pre-war average. In 1919, there was a slight fall during the spring and summer, but in the fall of that year it increased again to 125 per cent above pre-war. The increases during the greater part of 1920 were more rapid than during any previous period, reaching the maximum of 176 per cent above the pre-war level, but falling at the end of the year to 165 per cent. Living costs declined precipitously during the early months of 1921, reaching 133 per cent above the pre-war average on the first of April. On that date food prices were 238 per cent above pre-war, rent was 144 per cent higher, and clothing was 325 per cent more costly; the increase in the expenditure for fuel and light was estimated at 245 per cent and in the case of miscellaneous items 210 per cent. Material reductions were made in the cost of clothing during April and food continued to become cheaper. While predictions are dangerous, the cost of living may reasonably be expected to fall to less than double the pre-war average within a few months.

Wages Fall with Living Cost

The cost of living figures as published by the Ministry of Labor are accepted in an increasing number of trades as the basis for the readjustment of wages. While the cost of living was advancing, the workers were quick to recognize the relation between living costs and earnings and readily accepted contracts which incorporated a cost of living bonus in addition to a basis rate. In the majority of cases, there has been no trouble in the adjustment of payments to the workers, in accordance with these agreements.

Railroad Workers Contest Sliding Scale

In the case of railroad workers, however, there was a difference of opinion as to the interpretation of the sliding scale adjustment when the index number showed a decrease instead of an increase. The rates of wages of railroad men in the conciliation grades are made up of certain standard rates (agreed upon in March, 1920, and retroactive to Jan. 1, 1920), which represent the average pre-war weekly rate of pay in each

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group plus 38s. a week, and also further increases (ranging from 2s. to over 8s. per week) granted in June, 1920, the total wages in every case being subject to a reduction or increase of 1s. per week for each fall or rise of five points in the "cost of living." Adjustments of earnings in accordance with this agreement are considered at quarterly meetings of the Central Wages Board comprising representatives of the railroad managers and of the two unions involved. When this board met in March to determine wages for the three months beginning April 1, the relevant index number was 141 as compared with 169 at the last meeting. The trade union representatives argued that the previous ascertainment had been based upon a figure of 165, owing to the provision that only a full five points affected the result. According to the workers' contention, the difference between the two figures was 165 less 141, or 24, and the reduction in the cost of living bonus should be only 4s. The representatives of the railroad companies, however, urged that the cost of living index figures should carry exactly the same amount of bonus when descending as when ascending and, since on May 1, 1920, the index number of 141 had carried an agreed bonus of 3s., the proper reduction in the cost of living bonus was 5s. In short, the employers argued that all adjustments of bonus should go back to the starting point of the scale, viz., the index number of 125 in December, 1919, from which the original bonus dated. After discussion the union's claims were accepted, but a new scale was adopted in anticipation of further changes. Henceforth when the cost of living is falling, index numbers of 160 to 156 involve a bonus of 7s. a week on the basis rates, 156 to 151, one of 6s. a week, etc.; when the cost of living is rising, index numbers of 145 to 149 involve a bonus of 4s. a week, 150 to 154 one of 5s. a week, and so on.

Coal Miners' Wages

Owing to the wide differences in the economic state of coal mining in the different parts of the British Isles, it is doubtful if any British industry has as great variation in wage scales in the various sections. As a result of the several flat additions and bonuses granted to colliery employees since 1914, the differences are now less important than they were before the war, but, in March, 1921, just before the national strike, the average earnings of all classes of employees varied from less than £4 per week in Somerset and North Staffordshire to over £5 per week in Scotland and certain parts of Yorkshire. The wages of different grades of workers on company account seem to be remarkably similar, skilled workers receiving only comparatively little more than those who are totally unskilled. Miners and timbermen in South Wales, for example, received about 89s. 2d. per week, while "hauliers" got 80s. 9d. and underground laborers received 73s. 11d. In Cumberland the differences were even less, colliers receiving 80s. per week while other underground labor received 78s. 8d. and surface laborers got 71s. 4d.

These earnings are for employees on time work, whereas most of the more experienced miners were on tonnage rates and for such workers, weeky earnings of £10 or more were not uncommon. It is stated, however, that the average earnings of all classes of employees in and about British coal mines in January, 1921, were £22 1s. 9d., or about £5 per week, and this can be taken as the maximum average earnings for all classes of workers in any one month. Prior to the war the average earnings of all classes of colliery employees were about £7 10s. per month. In addition to their actual wages, however, the coal miners in England are furnished with house coal at nominal prices, and in many instances live in houses owned by the coal mine proprietors who ordinarily charge much less rent than other British workers have to pay for similar accommodations.

The wages of iron miners and quarrymen generally come under sliding scale agreements according to the selling price of pig iron. Among the best paid miners are those in the Cumberland district, whose wages reached 26s. 1d. per shift in January and were reduced to 23s. 10d. in March. In the Furness district iron miners were reduced to 16s. 6d. per shift in March as compared with a maximum rate in January of about 20s. Limestone quarrymen in West Cumberland were reduced in March by 1s. 8½d. per shift. Subsequent to the change, the wages of skilled workers ranged between 18s. and 19s. per day, while laborers got about 1s. per day less.

Wages in Iron and Steel Largely Scaled

The wages of almost all classes of workers in the iron and steel industry in Great Britain are adjusted more or less automatically according to the ascertained prices of the products. Most of the workers in these trades are relatively unskilled, but during and since the war they have been relatively well paid. The wages paid in the different sections of the country vary somewhat, but the average nominal wage of unskilled workers just prior to the slump in February, when they were at the maximum, was approximately 70s. 4d. per week of 47 hours. The actual average weekly earnings of all classes of employees in the iron and steel industry reached a maximum of 108s. per week in September when most of the works were operating full time. Owing to restricted operation of plants as a result of the coal strike in October, actual earnings declined in October and November, but again increased in December, owing to better working conditions. The maximum wages, however, were being paid in February when the nominal earnings of all classes of employees in the British iron and steel industry averaged approximately 132s. per full week or about 18s. to 19s. per shift of eight hours. Blast furnace employees were getting approximately 20s. a day in most districts, while the wages of common labor in the steel works were somewhat less. Open-hearth heaters and mill men are ordinarily paid on tonnage rates, the most recent adjustment in South Wales (March, 1921) fixed the wages of "teemers" at 8s. 4d. per shift plus 1d. per ton on the make of the shop between three heaters. The earnings of ladlemen were, for first helpers, 6s. 3d. and for second helpers, 5s. 3d. per shift plus 1/6d. per ton on the output of the shop between three heaters divided among three men of each of these grades.

Puddlers are invariably paid on a tonnage basis. The basis rate is 13s. 6d. per ton and this appears to be standard throughout the country. The additions to this base rate, however, vary somewhat in the different parts of the country according to the ascertained prices of wrought iron bars obtained by selected firms in each district. Decreases, amounting to from 20 to 25 per cent were recorded about April 1, bringing the puddling rate in Cleveland down to 202½ per cent above standard and in Scotland to 212½ per cent above the standard, or 40.8 and 42.2s. per ton, respectively.

Large Earnings of Skilled Men

The spread between the wages of highly skilled workers and common labor is greater in British iron and steel works than in other countries. Nearly all the men who are in charge of processes (such as head rollers, blast furnace keepers, etc.) are paid on a tonnage basis. Their earnings vary greatly in different plants, but are always high, many of these men getting £25 a week or more.

The wage advances in the iron and steel industry as compared with pre-war scales vary widely according to the class of work performed, being much greater for low paid men than for those who received good wages in 1914. According to figures published by the National Federation of Iron and Steel Manufacturers, the average actual earnings of all classes of workers in the iron and steel industry in Great Britain were at the rate of about £250 per year in 1920 as compared with £92 annually before the war, an increase of 172 per cent. Due to the fact that employment was generally better in 1920 than before the war, the increase in nominal wages was doubtless a little greater. Probably the largest increase for any single class was in the wages of common labor in the steel mills, which advanced from about 22s. 6d. per week in 1914 to 70s. 4d. in February, 1921, or over 212 per cent.

As a result of the established custom of fixing wages in most branches of iron and steel manufacture by means of wages boards for each class of workers in the various sections, the readjustment of wages in this industry to meet changing conditions of trade is not accompanied by the difficulties now encountered in other British industries. The principle that the workers' wages should be adjusted according to the selling prices of the products is accepted by both parties concerned. The work of the different wages boards consists mainly in the ascertainment of the average sales prices for certain specified products, as shown by the books of specified firms. These can be ascertained easily and quickly and wages are adjusted accordingly. The wages boards ordinarily meet every three months to fix the wages for the following quarter on the basis of prices prevailing during the preceding three months. Under this system, it will be seen that the workers gain the benefit on a declining market, whereas, when prices are rising, the employers have the advantage. In order to make the system even more flexible a few wages boards meet every two months.

Engineering and Shipbuilding

The wage increases to machinists and other employees in the engineering and shipbuilding trades have taken the form of flat increases to the basis rates as existing in different sections before the war together with various war bonuses. The last advance was at the end of May, 1920, when the basis rates had been advanced a total of 13s. per week and war bonuses totaling 26s. 6d. plus an additional bonus of 12½ per cent on the total weekly earnings had been given to all male employees over 20 years of age. Owing to the variations in local rates, the final wages of skilled workers in these trades vary somewhat in different sections of the country. In February, 1921, the wage for ordinary skilled machinists (fitters) ranged from 83s. 9d. to 89s. 4d. Millwrights and erectors generally received from 3s. to 5s. more per week. The 47-hour week is now standard throughout the country. Prior to the war the wages of skilled machinists averaged about 38s. per week of 53 hours.

Maintenance men in steel works and tin plate mills in South Wales were paid on a different basis until March 27 when they were given a flat rate of 100s. per week in place of the former arrangement of a basis wage of 43s. plus the then ascertained bonus (on the basis of steel prices) of 177 per cent. This wage, however, is still higher than that obtaining in other parts of the country where mechanics of similar skill get the same wages whether employed in engineering shops or on repair and upkeep of machines in other classes of production.

Apprentices are largely used for running semi-automatic machines and their wages will vary according to the class of work they perform. The wages for boys and youths, however, were fixed in the Midlands on March 21, 1921, on a new scale superseding the former arrangement, which included war wages of 10s. 9d. per week for all such workers. The present scale is as follows:

Machine Shops—Boys (Per Week of 47 Hours)

Age	Basis Rate		Bonus		Total Wages	
	s.	d.	s.	d.	s.	d.
14	10	0	4	0	14	0
15	12	0	5	0	17	0
16	14	0	7	0	21	0
17	16	6	8	6	25	0
18	19	0	12	0	31	0
19	21	6	14	6	36	0
20	23	6	18	6	42	0

The above rates do not apply to youths advanced to work as stampers in drop forging nor to apprentices already serving.

Iron molders, although belonging to a different union from that of the engineering workers, are paid on a similar basis. The variations in the basis rates are somewhat greater than in the engineering trades, ranging from 49s. to 62s. 8d. plus the war wages, totaling 26s. 6d. plus 12½ per cent on the total weekly earnings (i.e. from 84s. 10d. to 104s. 10d. per week of 47 hours, according to district).

Shop laborers in engineering works and foundries get from 61s. 6d. to 66s. 6d. plus 12½ per cent, or 69s. 2d. to 74s. 10d. per week, according to the district.

Wages of Women Workers

Considerable numbers of female workers were employed in the heavy machine trades during the war, but most of them have been weeded out and replaced by men or boys. A great many women, however, are still employed on light machine work and in the hollow ware and hardware trades. They are also found in the foundries as coremakers, etc., and in brass manufacture, operating capstan lathes or polishing. During the greater part of 1920 the wages paid to such labor in the Midlands averaged about 41s. 6d. per week. In the middle of March, 1921, a new scale was adopted resulting in decreases ranging from 2s. 9d. to 8s. 5d. per week. The rates now increase from 14s. 6d. per week for girls of 14 years up to 35s. per week at 20 years or over. On lighter work, or where little experience is required, the wages of women are only 32s. per week of 47 hours.

Piece work is common in many shops, but is not favored by the workers. The usual arrangement of piece rates is such that an average worker can earn 25 per cent more on piece work than on time work.

Wages in the engineering trades had not been reduced at the end of April, but conferences were being held for a general reduction. In certain districts, notably around Birmingham and Coventry and in Scotland, the individual shops had been able to induce their employees to remain at work and accept reductions of from 20 to 35 per cent. It is expected that the 12½ per cent increase on the total weekly earnings of time workers and the corresponding war bonus of 7½ per cent granted to piece workers will be removed before long and the basis rates and flat war advances will be reduced by at least 5s. per week. If this is done, the wages of skilled mechanics in England will be approximately 70s. per week or only about double pre-war wages.

Other Metal Trades

In general, the wages of workers in other classes of metal work are similar to those paid in the engineering trades, although not adjusted on a national basis. Sheet metal workers in Halifax, for example, receive 2s. 3d.. per hour, or slightly more than an ordinary skilled machinist. Male jewelry workers in London get 2s. 5d. an hour, while women in the same trade get 1s. 3½d. an hour. First-class electricians are paid about 2s. an hour. In the metal bedstead trade (Birmingham) the stockfitters in charge get 85s. per week, second-hands 70s., while "improvers" are paid on hourly rates of 1s. 4d. per hour for frame setters, 1s. 3d. per hour for cupola men and benders, and 1s. 1½d. per hour for other workers; all the workers in this trade receive an additional 10 per cent on basis time rates plus 30s. per week as a flat war bonus to all workers over 18 years of age.

In the manufacture of light castings, the standard rates for grinders and polishers are 41s. per week; blacksmiths, 38s.; fitters and pattern makers, 37s.; sheet iron workers, dressers, box fitters and berlin blackers, 35s. per week; all of these being subject to a flat war wage of 40s. per week plus 12½ per cent on the total weekly earnings.

The Trade Board governing the wages of employees working on stamped and pressed metal have established the minimum rates for male workers of 21 years and over at 1s. 4½d. per hour and of female workers of 18 years and over at 0s. 9d. per hour. These rates, however, are lower than those ordinarily paid in the district. In these trades the 47-hour week is established and only 4½ hours are worked on Saturday. Time and a half is provided for all times over 4½ hours on Saturday, even if the total number of hours worked per week does not exceed 47. Double time is allowed on Sundays and legal holidays.

The directors of the St. Louis Chamber of Commerce have decided upon a referendum vote to ascertain the sentiment of its membership on the question of the open and closed shop. The chamber has a membership of about 4800.

PRINCIPLES OF STORAGE

Experience and Practices of Pittsburgh Railways Summarized

Orderly piling, maximum visibility, absence of drawers, proper packaging and everything on wheels are the factors emphasized as essential for proper storekeeping, according to M. T. Montgomery, recently general storekeeper for the receivers of the Pittsburgh Railways Co., Pittsburgh, and now assistant to the general manager. He gave a paper on "Stores Engineering" before the Engineers' Society of Western Pennsylvania, which is published in the January, 1921, proceedings of that society. He states:

"Of all phases of operation which form the entity of a plant the question of caring for materials has not generally received the consideration it deserves. It was not considered of sufficient importance because the development of facilities entering into the manufacturing of products demanded most of the attention of those who kept pace with the times. Since intrinsic value of materials greatly increased, the investments in unapplied materials assume large proportions.

"The first requisite of stores engineering is cleanliness and nothing can be kept clean unless piled in orderly fashion." The Pittsburgh Railways Co. even piles its bolts. In reference to this Mr. Montgomery

(Above) An Old Case with 480 Drawers Was Converted into Modern Bins, with Everything in Sight

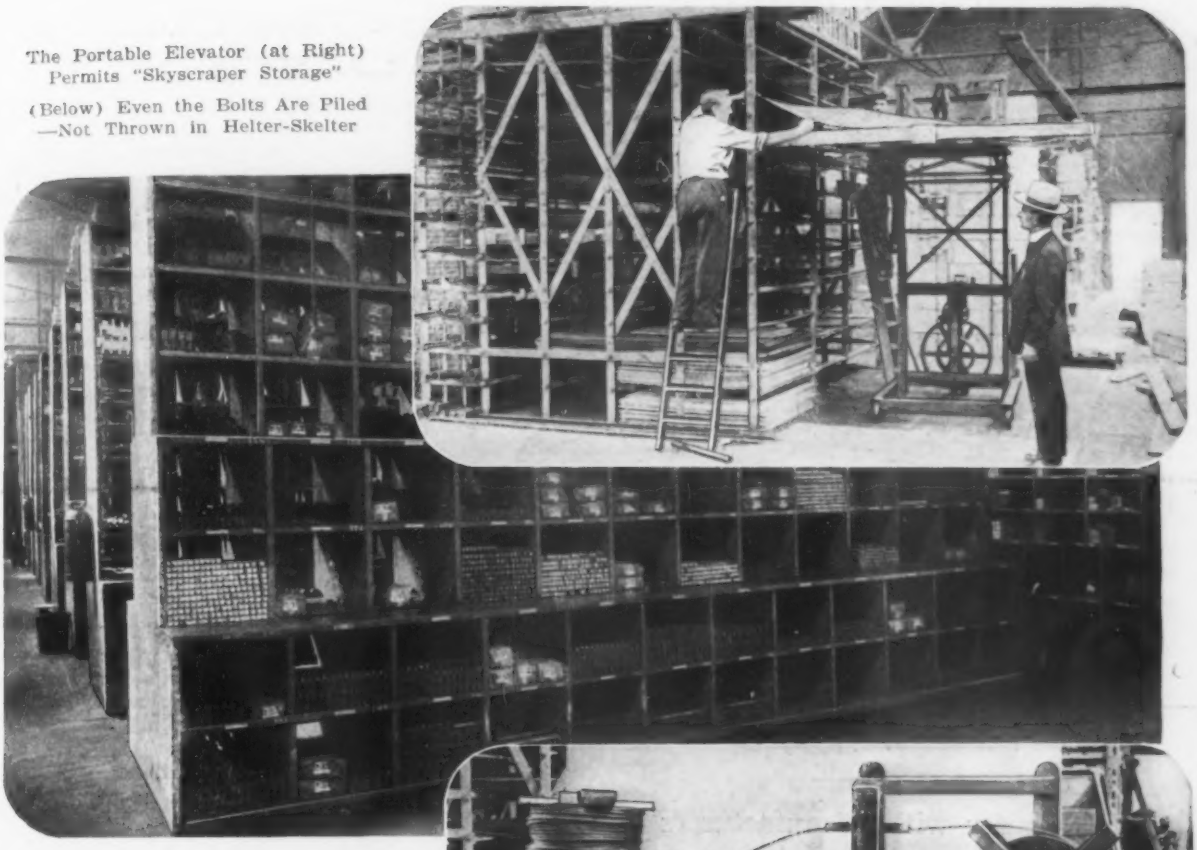
(Left) Ladders Are Equipped with Non-skidding Shoes

(Top, Right) "Everything on Wheels" — Even Barrels

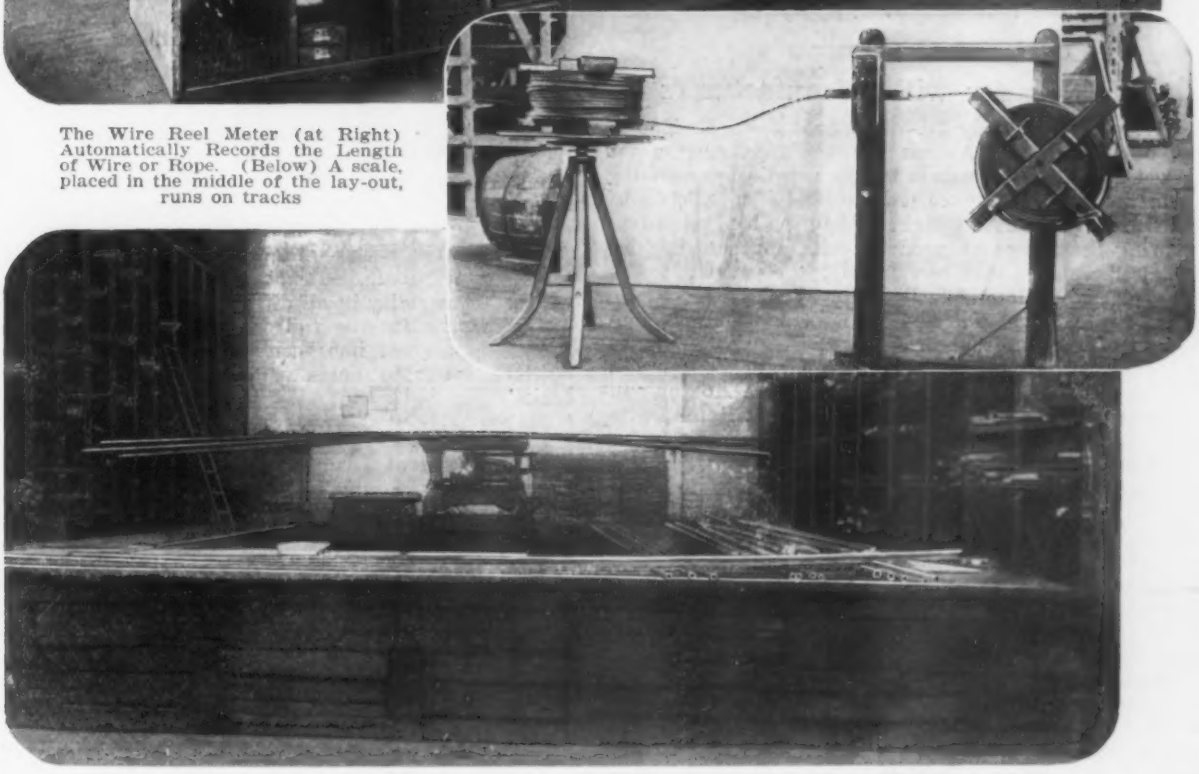
(Bottom, Right) A Traveling Hoist, Starting from the Receiving Floor, Runs the Length of the Warehouse

The Portable Elevator (at Right) Permits "Skyscraper Storage"

(Below) Even the Bolts Are Piled —Not Thrown in Helter-Skelter



The Wire Reel Meter (at Right) Automatically Records the Length of Wire or Rope. (Below) A scale, placed in the middle of the lay-out, runs on tracks



states: "Most people who saw our arrangement viewed this particular phase with a certain amount of misgiving. It seemed to them more or less a hobby and an expensive one at that, rather than an absolute necessity. It is a great deal more economical to pile goods in an orderly way than to throw material helter-skelter into receptables.

"Since we count our stock once a month it is necessary to do the work as quickly as possible and as accurately as possible. Our stores department calendar provides six days for actual taking of stock. The stock men do this, attending to their regular duties in addition. If materials were piled in a disorderly fashion this could not be accomplished; neither would we get anywhere if the bulk of the stock had to be counted by handling each piece. To count most of our material without actually handling it, we designed screen backs for our cases. As we insist upon counting materials without handling, we did away with drawers.

"Contrary to the belief of most operating men it does not cost any more to have vendors ship material in specified containers instead of according to the regular commercial practice. For instance, most manufacturers ship line ears, which support the overhead trolley wire, in barrels of from 180 to 220. We insist that they be shipped in boxes of 50. Small screws which are not of the standard commercial variety we order shipped in packages of 100.

"Economic operation depended on getting the most work done for the least number of man hours expended. Our success in this line may be attributed to the common-sense application of automatic lifting trucks and platforms, which means potentially 'everything on wheels.'" Among the devices are: A traveling hoist which starts from the receiving floor and runs the length of the warehouse; a device which automatically records the length of wire or rope; ladders equipped with non-skidding shoes; portable elevators for lifting sheets, tubing, etc., into the special racks.

"As the material is received, it is examined and

if ordered to certain specifications or blueprints, the engineer in charge is notified to pass on the goods. If the specifications call for a certain chemical analysis, samples are taken at random and sent to the laboratory for testing. Articles of small dimensions are tagged and the tag gives all the information necessary to trace the material to its source. Every package is opened and material examined; this, of course, does not hold good on standard packages of screws, nails, etc. We weigh the iron received by means of a portable scale in our iron rack.

"On our property we sell annually many thousands of dollars' worth of scrap. Ferrous scrap is taken to the scrap docks, where it is sorted according to kind and cut into charging-box size, if necessary. For this work use is made of an alligator shear and a cutting torch. The scrap is then put into bins. The non-ferrous scrap is segregated according to commercial practice and is handled at the general stores. The copper is put into shape for melting and when ready for sale is placed on lifting truck platforms—another instance of 'everything on wheels.' It is the custom at some points to dispose of the scrap once a month irrespective of market conditions, or else on a contract for the year based on the fluctuation of new metal. We have found it an additional source of revenue to follow the market. All scrap is sold to the highest bidder. We have a mailing list of scrap dealers and mills constantly in the market. We sell our scrap f.o.b. loading point and insist upon cash deposit for the value of each shipment before it is actually forwarded."

Will Confer with Manufacturers

WASHINGTON, July 26.—President John E. Edgerton of the National Association of Manufacturers has issued a notice to members of the association advising them that the conference it is to hold with officials of the Bureau of Census with regard to the biennal census covering "statistics of products of manufacturing industries" which are to be taken for the year 1921 will take place at Hotel Washington, Washington, at 10 a. m., Friday, July 29. Request is made that representatives of the different branches of industry who are affiliated with the association attend the conference. It is expected that Secretary of Commerce Hoover will be present to open the conference and participate in its deliberations.

"The Director of the Census desires this conference with representatives of the associations in order that he may consult with them concerning the number, nature and form of the various inquiries and the general scope and work of the Census Bureau," President Edgerton states, "as well as the methods of co-operation with the officials of the Bureau and Department to facilitate the work and accomplish the best and most useful results to American industry."

Among organizations asked to send representatives to the conference are the American Iron and Steel Institute; American Supply and Machinery Manufacturers' Association; National Association of Engine and Bolt Manufacturers; National Association of Brass Manufacturers; National Pipe and Supplies Association; Heating and Piping Contractors National Association; Railway Car Manufacturers' Association; American Hardware Manufacturers' Association; National Implement and Vehicle Association; Refractories Manufacturers' Association; Electrical Manufacturers' Club; National Automobile Chamber of Commerce and the National Coal Association.

The June output of the Ford Motor Car Co. in the United States was 108,962 passenger cars and trucks, which is an average of 4190 cars for each of the 26 working days. This is the high mark in the history of the company, breaking the May record by 7486. The schedule for July calls for 109,000 cars and trucks. The sales department reports that the demand for closed cars has been exceptionally strong, but that all models are in greater demand than production facilities can provide.

The Changed Status of Southern Blast Furnaces

In its weekly comment on pig iron conditions the Matthew Addy Co., Cincinnati, goes into particulars concerning the way in which Southern producers of pig iron have had their sphere of operations limited by high freight rates:

"Some of the things that distress pig iron may be deduced from the fact that there is only one merchant furnace in blast in the states of Tennessee and Alabama. Ordinarily there are about twenty-five furnaces in blast in the South. Birmingham used to supply all the iron needed on the Pacific Coast. The freight rate in the old days was $12.32 per ton, but to-day the rate is $22.40 per ton. And all the iron that is needed on the Pacific Coast is coming by sea, most of it from Belgium.

"The present cost of very high-grade coke from Connellsville is $4.50 per ton. In the old days the rate to California was $11.30 per ton; the present rate is $19.76. And all the coke that California and the Pacific Coast uses is now coming from Germany. The old freight from Birmingham to Cincinnati used to be $2.75; it is now $4.50. The freight on pig iron to St. Louis before the war was $2.75; to-day it is $5.25. The South has just about gone out of the pig iron business because freight rates are so high as practically to build a wall around the Southern furnaces. It is not necessary to make any elaborate argument in the face of such features, and in a greater or less degree all the iron business in America is confronted with just such changes in freight rates which have profoundly and tremendously altered all economic conditions. It may be that freight rates were too low, but American business has been built up on cheap transportation and plenty of it, so to speak, and of late we have been having highly expensive transportation and mighty little of it.

"During the war the higher the price and the more things cost, the better—'the more the merrier' seemed to be the program. But not now. We are going back with great rapidity in all directions to the solid ground of the past. But the railroads are still at the peak. Immense progress has been made in some directions, but the railroads are now distinctly holding things back."

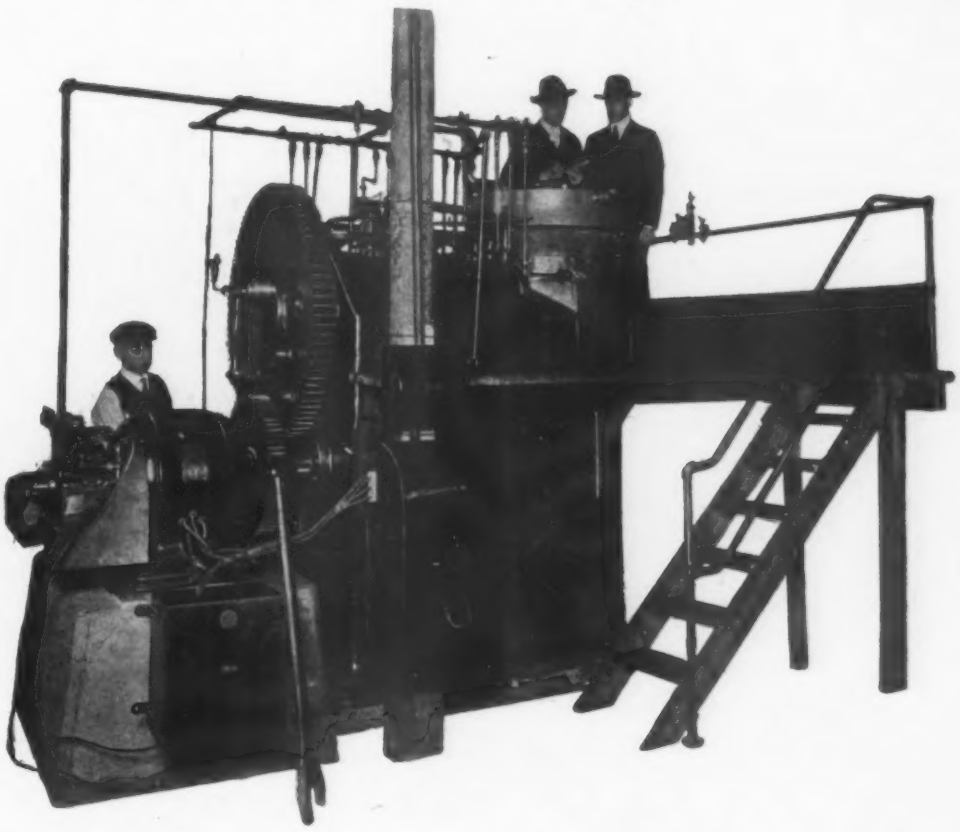
New Chief of Division of Commercial Laws

WASHINGTON, July 26.—The appointment of Archibald J. Wolf of New York to take charge of the newly created Division of Commercial Laws, announced last Thursday, creates a feature of the work of the Bureau of Foreign and Domestic Commerce, Department of Commerce, which departmental officials consider particularly necessary at this time owing to the many changes or modifications in the commercial codes of the most important countries of the world which have taken place since the armistice. It is intended that Mr. Wolf will immediately take steps to obtain reliable information regarding foreign commercial laws for the benefit of American business men interested in foreign trade. His work will deal with such subjects as the incorporation of American firms abroad, status of American firms in foreign countries from a legal standpoint, legal steps necessary in connection with the establishment of American branch plants or sales rooms abroad, etc.

Several years ago, Mr. Wolf was an active member of the field staff of the Bureau of Foreign and Domestic Commerce and in that capacity conducted several foreign investigations. One of his best-known products, from an official viewpoint, is a report on the credit practices and methods in vogue in foreign countries known as Special Agents Series No. 62—"Foreign Credits." Some of his other official reports deal with commercial organizations in Germany, France, Switzerland and the United Kingdom. He is also the author of several well-known unofficial books on export trade, and financial and legal subjects.

Cuts Teeth of a Gear at One Operation

The Stevenson Multiple Shaper and How It Operates and Its Field



THE Stevenson Gear Co., Indianapolis, has developed a new type of gear cutting machine known as the Stevenson multiple shaper, which cuts all or a multiple number of teeth in a gear or similar product at one operation. The essential member of the machine is a special tool head which consists primarily of a series of radially disposed tools spaced about the circumference of the blank to be cut. Operation is the same as an ordinary vertical shaper except that the tools are held stationary and the gear blank reciprocated past the tools. The mechanism consists essentially of a ram carrying a blank-supporting arbor and the multiple tooled head for operating upon the blank.

The frame of the machine is a casting of rectangular box section with a vertical cylindrical portion at one end in the center of which the ram is mounted. The tool head is placed above the ram at the top of the cylindrical portion. The crank shaft which drives the ram is journaled near the top of the rectangular section and is provided with an adjustable crank head at the end next to the ram and is driven through back gears by an individual motor. The arbor which carries the gear blanks fits in a socket in a spindle which is journaled inside the ram and is free to rotate independently of the reciprocating motion imparted to it by the ram. An intermittent indexing movement is imparted to the spindle after each cutting stroke by an intermittent gear train. The machine illustrated is 7 ft. high, weighs 17,000 lb. and when operating to full capacity is driven by a 100 hp. motor. Its capacity is for gears 12 in. in diameter, 6 in. face, 4 diametral pitch.

The tool head consists of a flat, steel disk 3 ft. in diameter, provided with a hole at the center and a number of radial grooves cut in its face in which the tool bits are arranged about the circumference of the gear. Successive feeding movements are given the tools by an annular sectional cam ring. As the gear blank is reciprocated past the cutting tools, the tools are gradually fed in by successive cuts to the full depth of the tooth. At the completion of each stroke of the ram and before the next cut begins, the gear blank is indexed a space equal to one tooth, thereby presenting a different tool to each tooth from the one which made the previous cut. After the tools have been fed in to full depth, they are held stationary in that position while the cutting process continues until the gear has indexed one complete revolution, thereby giving each tool an opportunity to take one last cut on each tooth. This final complete index is intended to give uniformity of spacing of the teeth in the gear equal to that of the indexing mechanism. Uniformity of the tooth form is secured even though the tools themselves may not be uniform, because if any tool is longer or wider than any other that portion of it which is longer or wider will take one last cut on the corresponding portion of each tooth in the gear, thereby eliminating variation which may have been caused by previous cuts. This process of finishing all the teeth of a gear with a single finishing tool is intended to provide accuracy; and the speed is multiplied by the number of tools operating on the gear blank at one time.

To a designer the most interesting individual mechanism on the machine is the tool head. In the illustrations given Fig. 2 is a top view showing the tool head as it would appear when in operation, Fig. 3 is a bottom view as it would appear when taken off of the machine ready for disassembly or adjustment. Fig. 4 shows the tool head partly disassembled with the principal details of its mechanism exposed. When mounted on the machine the only working parts to be seen are the points of the tool bits surrounding the gear blanks and the small depth adjustment dial. The four pairs of T slots are for attaching a piloting device, which is used on extremely long and slender arbors which may need an outer support.

Two tool heads are provided for each machine, and while one is in use the tools of the other are being sharpened and reset. The tool head is held in place by 8 studs and nuts, which when it is desired to set up a new job or to sharpen the tools, are taken off and the tool head lifted bodily and replaced by the other tool head. This arrangement is calculated to eliminate loss of time on account of set-up and sharpening tools. As the tool head is taken off it is turned bottom side up on trunnions, the clamp and gear plate being removed, exposing the tools and the feeding mechanism.

The tool bits are rectangular in section except the

lower side, which is in the form of a V. The gear tooth profile is formed at the inner end of the tool and is backed off to permit sharpening without changing the form. The outer end of the tool rests against a spiral cam surface and is ground in the form of an exact radius. A small pin near the back end fits in a groove which has an opposing spiral surface and retains the tool in close contact with the other cam surface, providing correct contact and withdrawing the tools to their starting position after the cut is finished.

Individual cam lugs are mounted on a large ring which encircles the tool bits and spacing plate, and are held down by T bolts fitting in a circular T slot in the ring. The bits are adjusted for depth independently by moving the cam lugs individually along the T slot relative to the cam ring and each other. Simultaneous feeding movements are imparted to the cam ring through two idler gears, seen in the lower part of Fig. 4.

The final depth to which the tools are fed is determined by an adjustable stop which positively limits the rotary feeding movement of the cam ring. This feed mechanism being spring actuated, the position of the depth controlling stop can be varied within reasonable limits without resetting of the feed mechanism. The dial which controls this adjustment can be quickly reset whenever desired.

To provide relief for the tools on the back stroke

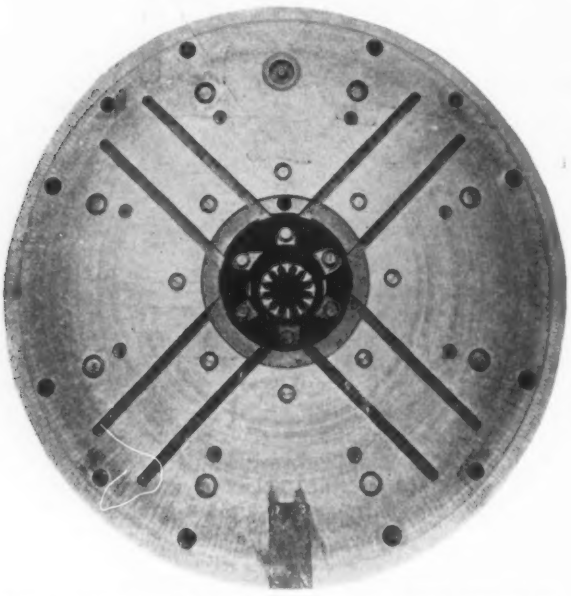


Fig. 2—Top View of Tool Head As It Would Appear in Operation

of the ram, a reverse feeding movement is imparted to the cam ring, and before the beginning of the cutting stroke, the forward feeding movement of the cam is made great enough to compensate for the slight retraction for relief and also to provide the necessary additional feed for the depth of the next cut.

The large gear and plate shown in Fig. 3 are used to intermittently clamp and release the tool bits during the cutting and feeding operation. The lower central plate is mounted directly above the tool bits and is provided with adjustable set screws and lock nuts above each tool. The outer gear member is free to rotate about the central plate and is provided with screw threads which engage a corresponding threaded portion of the tool head base. A rotary reciprocating motion imparted to this gear by a cam operated segment clamps the tools during the cutting operation and releases them during their relief and feeding movements. This clamping arrangement by forcing the V-shaped seat on the tool bit into a corresponding seat on the spacing plate in the tool head serves to centralize and accurately locate the cutting point of the tool, in addition taking up clearance and looseness, eliminating vibration and chatter.

The feed and clamping mechanism shown in Fig. 5 comprises the segments and cams for actuating the tool

Fig. 3—Bottom View of Tool Head As It Would Appear When Taken Off of Machine for Disassembly or Adjustment

head feed cam and the tool clamping gear. The feed cam segment which is shown near the center of this illustration swings about the central stud as a fulcrum, and is moved directly by a spiral cam, which is rotated intermittently by a ratchet on which it is mounted and can be adjusted to produce various feeding motions. The cam has a long gradual slope for the feeding movement and a sharp descent for quickly returning the tools to their starting position at the completion of the cutting operation. The slight retraction for producing the relief movement is accomplished by mounting the fulcrum stud eccentrically on a shaft which is given a partial rotation by a face cam on the large driving gear. The tool clamping gear segment seen in the lower part of the illustration is actuated directly by a push rod in contact with another face cam on the large driving gear. The releasing movement is accomplished positively, but the clamping movement is effected by means of a spring in order to eliminate the possibility of breaking some part if the clamping mechanism were accidentally adjusted too tight.

The indexing mechanism as shown in Figs. 6 and 7 consists of a split bushing guide, one-half of which is attached to the ram spindle, the other half being attached to a revolving drum on which is mounted a worm gear driven by a worm and an intermittent gear train. The intermittent indexing movement is derived from a Geneva wheel and is transmitted through a set of

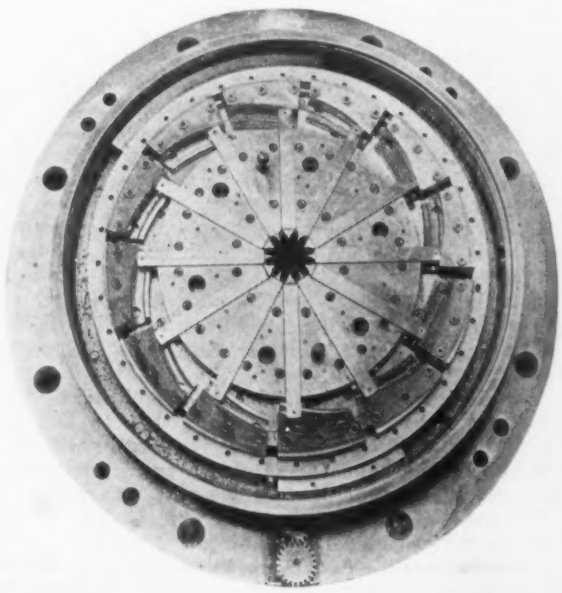


Fig. 4—Tool Head Partly Disassembled with Principal Parts of Mechanism Exposed

change gears to the worm and worm wheel. By varying the ratio of the change gears in the train, indexing movements for any desired number of teeth may be obtained. Minute angular adjustments of the spindle position varying by one second of arc, for locating keyways, teeth of cluster gears, etc., are obtained by means of a differential clutch between the worm and worm shaft.

The main crank shaft is connected to the large back gear by a quick return crank of the drag link type, giving a slow cutting stroke and quick return. The driving motor is mounted on a sliding base and drives through a single set of speed change back gears, the drive for the indexing mechanism being taken direct from these gears. The motor is controlled by a push button switch, automatic compensator and solenoid electric brake.

The work arbor used in this machine has a taper shank and thrust collar, and fits the tapered socket in the ram spindle. The gear blanks are put on the arbor and fastened in place by a nut, while the arbor is held in a vise-like fixture attached to a bench at the side of the machine. After loading, the arbor is dropped into the taper socket in the ram spindle and the machine is ready to work. The thrust of the cut forces the taper back into the socket until it strikes the shoulder of the arbor. While one arbor of gears is being cut, another arbor is being loaded with blanks. As the arbor is finished the operator, holding the arbor of uncut blanks in one hand, stops the machine, presses a foot pedal, knocks out the arbor of completed gears, and catches it in the other hand. He then drops the arbor of uncut blanks into the open socket, the operation of stopping, changing arbors and starting again, it is claimed, consuming less than ½ min. The total time of completing an arbor of gears ranges from 1 to 3 min.

In cutting some gears, it is desirable to use as many tools as there are teeth in the gear. In others it is more practical to use only half or a third as many tools as there are teeth, in which case a tool head equipped with any number of tools could cut gears having any number of teeth which is a multiple of the number of tools used. Thus a spacing plate having 10 tools could be made to cut 10, 20 or 30 teeth, etc. In a case like this, if it is desired to cut a number of teeth greater than the number of individual tool bits which can conveniently be placed within the space a gang tool bit is used in which each tool cuts two or more teeth. This is particularly advantageous in cutting gears having a large number of very fine teeth, because although the amount of power required for cutting all of the teeth is small, it would nevertheless be practically impossible to use as many individual tools as there are teeth in the product.

To cut a gear having an odd number of teeth and where it is not practical to use a tool for every tooth, as in the case of a 29-toothed gear, for example, ten

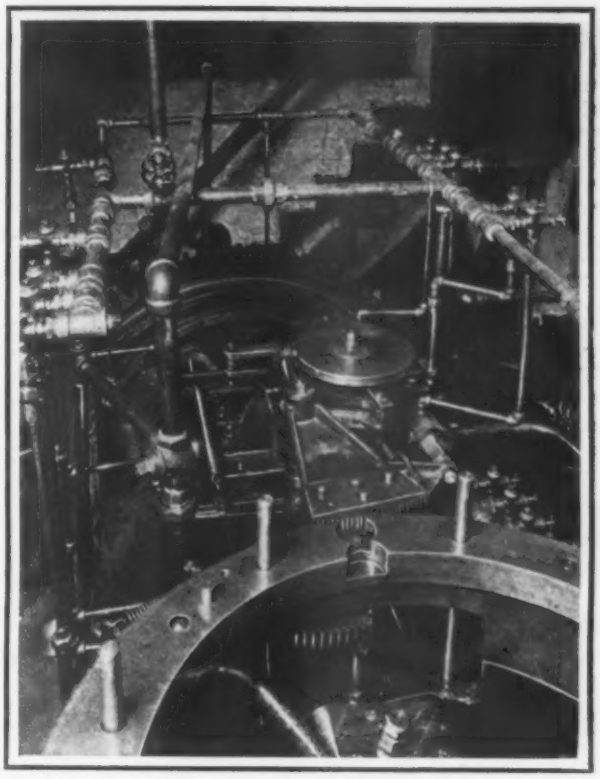
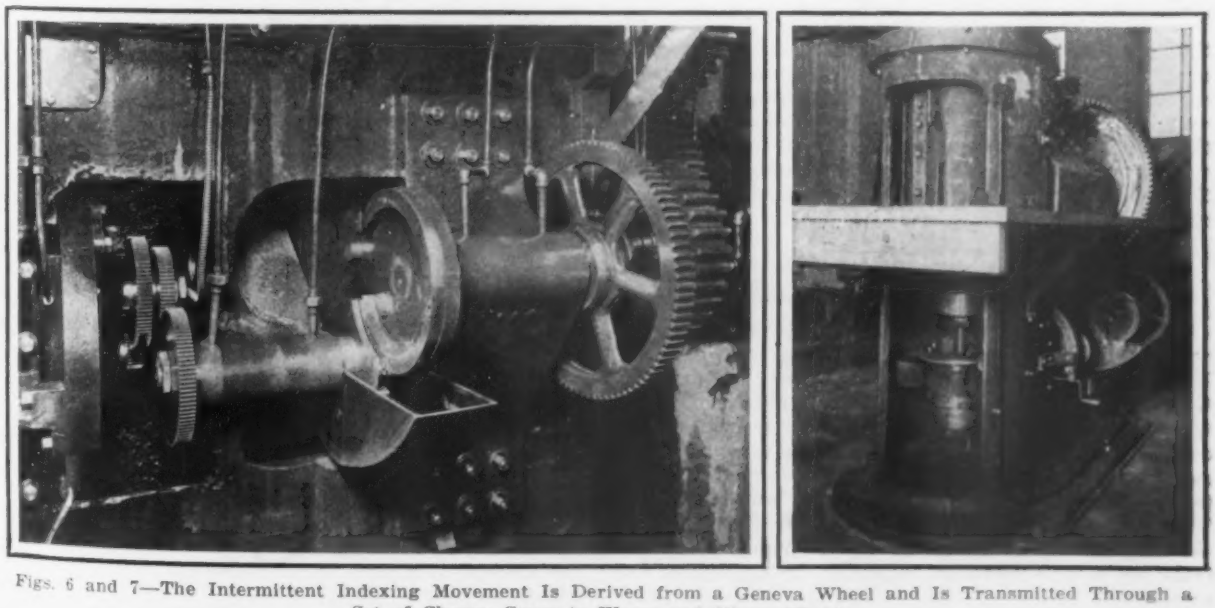


Fig. 5—Toothed Segments for Actuating the Head Feed and the Tool Clamping

tools might be used. Nine of the spaces between tools would be equal to 3/29 of a circle each and the tenth space equal to 2/29. While the service on one tool would be slightly less than that on each of the other 9, the difference would be scarcely appreciable.

In some cases, it is desirable to make every other tool in the form of some sort of a roughing tool, either a square nose gashing tool or a stepped roughing tool of the usual type and so adjust them that they will remove most of the stock from the tooth space. The alternate tools are then made in the usual type of finishing tools and take the last few finishing cuts. At other times, a special cam is provided for one tool, it is held back during the stock removing cuts and is then suddenly fed forward ahead of the other tools to take the finishing cuts on all of the teeth. These various arrangements are merely suggestive of a few of the possibilities in this line, but a number of possible combinations will readily suggest themselves to tool designers and set-up men.

Although the multiple shaper is classed as a gear cutting machine, it is adapted to the production of all



Figs. 6 and 7—The Intermittent Indexing Movement Is Derived from a Geneva Wheel and Is Transmitted Through a Set of Change Gears to Worm and Worm Wheel

cylindrical products having teeth or grooves such as sprockets, splined shafts, reamers, taps, milling cutters, saws, ratchets and knitting machine rolls. The advantage of cutting the teeth on the various products with the Stevenson multiple shaper compared with standard one tooth machines, varies as the number of the teeth or grooves in the product or the number of tools used. The reason for this is that the standard machines ordinarily cut one tooth at a time and the Stevenson shaper ordinarily cuts all the teeth at once and consequently the products having the larger numbers of teeth have a greater capacity for increase than those with small numbers of teeth.

A few examples of the cutting time records which have been made on various products are shown in the following table, and will serve to illustrate the remarkable time saving made by the Stevenson process. Ordinarily a machine is considered as quite an improvement if it saves 5 or 10 per cent on a product, but a saving of 50 to 80 per cent is indeed a rare feat of engineering and invention. The standard machines were operated very close to their maximum speed capacity, while the Stevenson machine was run at a very moderate speed. If its speed had been increased to equal that of the others, the time saving would have been still greater.

Comparative Tooth Cutting Time for Various Products Cut on Standard Gear Cutters and on the Stevenson Multiple Shaper

Product	10 P 24T ½-In. Face Gear	3-In. Diam., ⅝-In. Pitch Sprocket	1½-In. Splined Shaft	1-In. Machine Reamer	3-In. Milling Cutter	2¾-In. Screw Slotting Saw
No. teeth in product..	24	12	6	8	12	72
No. tools used in Stevenson multiple shaper	12	12	6	8	12	36
No. blanks on arbor..	6	16	1	1	8	120
Cutting time per piece (standard gear cutter), min.	1.6	1.04	3.3	3.24	3.6	0.48
Cutting time per piece (Stevenson multiple shaper), min.	0.4	0.23	1.35	1.04	0.36	0.01
Per cent saving in time by Stevenson shaper	75	78	59	68	90	96

An interesting example of one advantage of the machine was found in fluting 1 in. taper shank machine reamers. The holder first made for this purpose was provided with a tapered socket for holding the tapered shank of the reamer and also a collar for supporting the neck of the reamer up near to the flutes. As soon as the job was put in to operation it was found that the cutting pressure was so evenly balanced that the neck support was entirely unnecessary and therefore it was not used. The reamer was held by the taper shank only, with an over-hang of 5 in.

Another example of the advantage was found in cutting gears of different materials stacked on the same arbor, such a combination of steel, brass, raw-hide, etc. Eight blanks of different materials, such as steel, cast iron, fiber, bronze and aluminum, were stacked on the same arbor and cut at the same time. It was demonstrated that the variations in pressure caused by the different materials were unable to affect the accuracy of the tools.

Improvement in Fabricated Steel

The amount of fabricated steel business that was contracted for in June, according to the records of the Bridge Builders and Structural Society, George E. Gifford, secretary, 50 Church Street, New York, was 66,900 tons. This corresponds to 37 per cent of the capacity of the bridge and structural shops of the country and is the largest monthly volume since September, 1920. The total for the first half of 1921 is 283,400 tons, which compares with 324,900 tons for the first six months of 1919, when business was recovering from the stagnation following the signing of the armistice.

"Pittsburgh Plus" and Good Roads

The American Farm Bureau Federation has issued statistics showing the added cost to good roads which is due to "Pittsburgh plus." The figures were obtained from the State highway commissioners of the states mentioned and represent estimates of the amount of steel to be used on roads to be constructed within the next four years. The excess cost of freight on steel from Pittsburgh to typical points in each State as compared with the cost from the nearest steel mill was set down as the "average cost of Pittsburgh plus." The figures show that in 10 states the extra toll paid to "Pittsburgh plus" during the next four years will amount to nearly $2,000,000 for roads alone. According to the Farm Bureau Federation, this will be paid in taxes largely by the farmers. The data follow:

State	Amount of Steel to Be Used	Average Cost of "Pittsburgh Plus" (Per Ton)	Total
Illinois (4000 miles, 16½ tons per mile)	66,000 tons	$7.60	$504,000
Alabama	12,000 tons	10.00	120,000
Montana (amount for bridges unknown)	900 tons	7.00	6,300
Nevada	1,450 tons	7.00	10,150
Arizona	1,200 tons	7.00	8,400
Michigan	16,000 tons	2.00	32,000
Washington	28,000 tons	7.00	196,000
Wisconsin	50,000 tons	7.60	380,000
Arkansas	25,000 to 30,000 tons	7.00	200,000
Minnesota	60,000 tons	7.60	456,000
Ten states	260,000 tons	Total cost	$1,912,850

The resolution condemning the Pittsburgh basing point for steel prices, adopted by the House of Representatives of the State of Missouri on June 21, was concurred in by the State Senate on July 13. This makes five State legislatures which have gone on record as opposing "Pittsburgh plus," those which took previous action being Minnesota, Wisconsin, Illinois and Iowa. A like resolution is expected to be adopted by the legislature of Georgia which is now in session.

Wages in New York Factories

The Bureau of Statistics of the New York State Industrial Commission reports average wages during the month of May in factories in the State at $25.86, a reduction from the $28.45 per week in May, 1920, but a figure much higher than that obtaining in the corresponding month of any previous year. It is more than double the $12.74 of May, 1915.

Figures for the "Metals, Machinery and Conveyances" group of industries are consistently higher than the average. In this group the average weekly wage in May of this year was $28.16, compared with $31.50 last year and $14.61 in 1915.

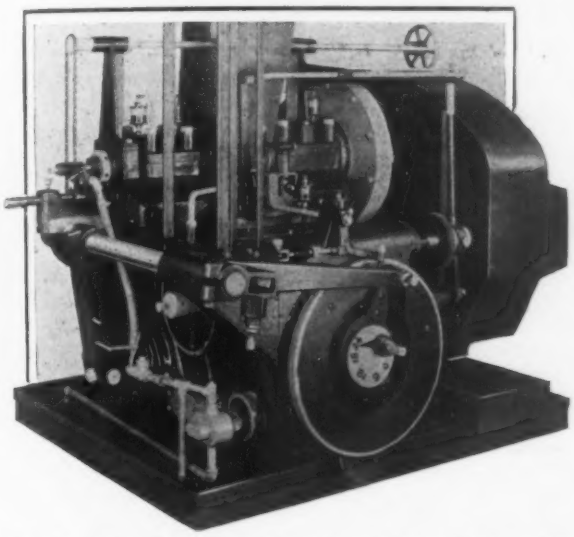
The high water mark of earnings expressed in dollars per week was reached in October, 1920, with an index figure of 228, based on June, 1914, at 100. There has been a consistent drop month by month since October (except that March was a little heavier than February) to a figure of 204 for May. This leaves the wage increase at 104 per cent above the figure for June, 1914.

Compared with this, the retail food price of the United States Bureau of Labor Statistics shows that food is only 46 per cent above the figure for June, 1914. Corresponding figures for retail food prices in New York City and Buffalo show respectively 45 per cent and 39 per cent above the figure for January, 1915. In both these cities, as well as in the United States as a whole, the maximum of food prices was reached in July, 1920, since which time a reduction of approximately one-third has materialized.

The Mutual Enamelware Co., Chattanooga, Tenn., a subsidiary of the Crane Co., Chicago, is installing a 292-kw. connected electric vitreous enameling furnace capable of heating up to a temperature of 1700 deg. Fahr. The furnace will be used for bath tubs and other bathroom and lavatory fixtures, and is being built by the George J. Hagan Co., Pittsburgh, in collaboration with the General Electric Co.

New Automatic Surface Grinding Machine

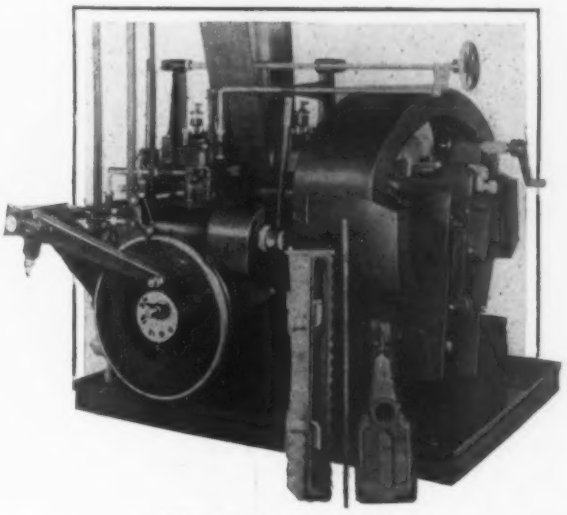
An automatic surface grinding machine of unusual design has been built by William Osterhom, consulting engineer, 2301 North Knox Avenue, Chicago. The machine embodies a number of operating features which will prove of particular interest to shops in which the surfacing of parts up to 12 x 40 in. is part of the daily routine. The general view of the machine shows it equipped for grinding plain surfaces, such as are shown in the foreground. One of these castings is a radiator top for a motor truck, 4 in. wide by 32 in. long, of very flimsy section. The other piece is a small drill



Work Is Locked in Fixture Mounted on Tilting Table, Hinged on Swinging Arm. This view shows position for grinding

press base, about 10 x 20 in. The chucking time from floor to floor was 13 sec. and the actual grinding time 45 sec. About 3/32 in. of metal was removed from the castings in that space of time.

The machine is completely automatic except for locating the work and locking it in the fixture. The latter is mounted on a tilting table, which is hinged on a swinging arm and thrown into proper relation with the surface of the emery wheel by means of an



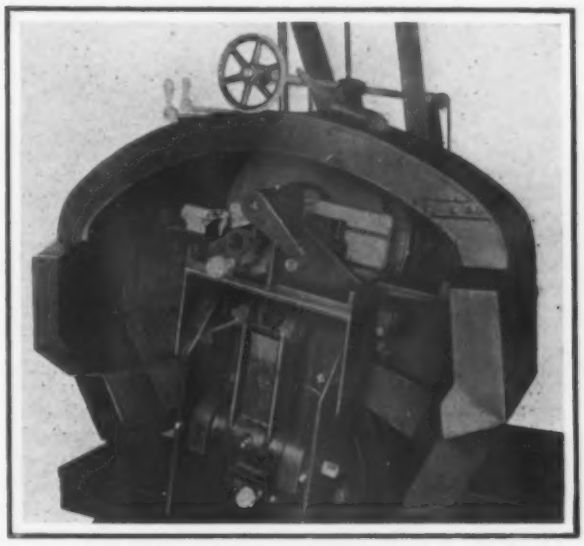
Rear View of the Machine

operating cam. With the completion of the cycle of the cam, the fixture automatically tilts back 45 deg. away from the emery wheel surface, giving the operator a clear field for removing his work. The work arm carrying the fixture oscillates back and forth across the emery wheel during the course of operation.

For dressing the wheel an emery wheel dresser is inserted in the fixture with the tilting table in grinding position. The swinging of the work arm in front of the wheel gives the latter a true surface relative to the oscillation of the arm. In accordance with the requirements of different jobs, the length of the stroke of the swinging arm may be varied from 2 in. to 24 in. and, by means of a change gear box, the time element may be varied from 10 sec. to 2 min. Thus, if it is determined that a certain piece can be finished in 45 sec., the gears are so set that the operating cam makes the cycle in that time.

Water is automatically turned on and off with the opening and closing of the tilting table. This arrangement protects the operator who would otherwise get drenched while locating his work on the fixture. A rotary pump supplies the cooling water through the center of the spindle to the emery wheel, and if delicate parts, such as harvester knives, edged tools, hardened steel pieces, etc., are to be faced, water is also supplied through the fixture.

The feed of the emery wheel is automatically controlled by a cam, the wheel being fed gently forward on to the work by a series of steps. This insures a true surface for the wheel and prevents the rounding of corners, thereby lengthening the life of the abrasive. Actual grinding is not started until the work has been placed in position, it then being accomplished by pulling a handle on top of the machine. The handle throws a belt on a tight pulley behind an arrest lever which holds the belt shifter in place until the cycle of the operating cam has been completed. The sheer drop on the cam releases the arrest lever and also raises the work into grinding position. By means of a lever and roller a series of steps on the radial part of the cam communicate the rotary action to the lever shaft



Inside of Wheel Housing, Showing Work in the Fixture in Process of Being Surfaced

which in turn drives the wheel housing forward a preconceived distance against the work. A quick return of the lever to its original starting point traps the shifter arrest lever, unlocks the tilting work table and stops the action of the machine. An emergency stop adjacent to the throw-in lever has also been provided. This stops the action of the grinding machine instantly. A noteworthy feature of the feed lever is the fact that it has been cushioned so that in heavy grinding of irregular castings the wheel is not subject to destructive resistance but has an opportunity to adjust itself through the action of the cushion spring taking the shocks and allowing the wheel to cut itself free.

Wear of the wheel, as well as the proper placing of the wheel housing in relation to the work surface is taken care of by a hand wheel, graduated in thousandths of an inch, convenient for the operator. Another lever adjacent to the change gear box allows the operator to stop the rotation of the cam without stopping the swinging of the work arm. This is advantageous when dressing the emery wheel, as feed during dressing would result in an irregular surface.

The entire working mechanism is supplied with positive oiling devices. The spindle, which is 42 in.

long and 4 in. in diameter, has forced lubrication. It is also equipped with a system of thrust bearings to counteract the thrust of the wheel.

The machine may be equipped with automatic magazine feed if so desired. In this case, two magazines would be used, one for receiving and one for delivery. If the receiving magazine should get clogged up, the machine would automatically stop. Likewise, if the raw material magazine is emptied to a certain point, the machine will stop. This method of grinding is desirable on such work as facing thin hardened pieces of steel up to 6 x 6 in., thrust washers, reamer plates, and, in fact, anything that can be stacked and magazined properly.

The weight of the machine is 7800 lb. and its floor space, 72 x 84 in. A 20 in. diameter cylinder wheel, 8 in. thick and with a 10-in. hole is used. A 20-hp. motor is required when operating at maximum cutting speed.

Mr. Osterhom, the designer, has patents pending in the United States and foreign countries. He was formerly mechanical engineer of the Interrational Harvester Co., Chicago.

Large Cores for Turbine Castings

Difficult Foundry Operations in Making Castings for Steam Turbines for Scout Cruisers —Methods Employed in Making Cores

STEAM turbine castings for two scout cruisers, involving large core work, were a feature of after the war work of the Farrell Foundry & Machine Co., Ansonia, Conn. They were made by the Fore River works at Quincy, Mass., of the Bethlehem Shipbuilding Corporation, Ltd. During the war the Farrell company delivered considerably more than 100 of these castings to the shipbuilding company and as a result of this war work was awarded the 1921 sub-contracts. Each scout cruiser is equipped with four shafts and each shaft has one high, one intermediate and one low pressure turbine, making a total of twelve turbines to each vessel and necessitating 24 castings having a total approximate weight of 100 tons.

The steam turbine castings presented difficulties on account of their size and the danger of damage to cores in assembling. The cores were set by measurement. The final coring up was difficult because the bottom core prints were relied on to eliminate trouble during the lowering of the drag and cheek on the cores. It invariably was necessary to true up the larger cores by rocking, allowing fine sand to run in under the core during this process. In the case of the low-pressure turbine castings, illustrations of which are shown, there were eight cores in the upper half and nine in the lower.

The average thickness of the castings was ⅞ in. and the weight approximately 8200 lb. They were required to pass Government inspection before leaving the foundry. Specifications called for a transverse strength of 2200 to 2800 lb. per sq. in. and a tensile strength of 20,000 per sq. in.

In making the main cores the core box was set up on a plate, rammed up and bound by cast iron arbors. These arbors were provided with five hooks, which were screwed into nuts cast in the bottom of the arbors. The cores were picked up green, slicked up with a stiff blacking, placed on the oven car and thoroughly baked. After baking they were set up, preparatory to casting, the hooks were removed, and the resulting holes were filled with sand and smoothed over. The large cores were made by the same method, only fewer hooks were used. Small cores were made in the usual manner.

Each core, after being set in place, was carefully slicked to eliminate chipping of the finished casting. In view of the nature of the work there were few fins.

All inside surfaces of the castings, especially those in which the turbine blades operate, were machined at the Fore River works, but the amount of stock removed in this operation was slight. Machining was for the purpose of removing any particles of metal that might affect the course of the steam through the turbine. On the cope side of the machining surfaces an extra finish was allowed to take care of any dirt, but, aside from this and the flanges, little machining on the outside of the castings was necessary.

One illustration shows a pattern being rammed up, immediately in the rear of the cores assembled in the foreground. In this practice the drag is laid down and leveled and the bottom swept up 4 in. below the joint of the flask. The bottom flange is then laid down on the swept space and rammed up level with the joint of the flask. There the parting is made. A cheek is next laid down 18 in. deep, and arbors, cast to fit inside the flask ½ in. to ¾ in. away from the pattern, are laid in and hooked up to the top of the cheek. The cheek is then rammed up to the joint. Another is placed to complete the height of the flask to the top level of the pattern. These two cheeks are clamped together and the second rammed up to the joint, where parting is made. The cope, 10 in. deep, is then rammed on top of the cheek and pattern.

The cope is next taken off and the cheeks lifted complete, leaving the heavy pattern lying on the bottom of the flask. The molds are then slicked up with a very stiff blacking and placed in ovens, where they remain about 42 hr. As a rule the arbors are not broken after casting, as the workmen exercise care in extracting them from the sand. The flasks are 7 x 9 ft., inside measurement.

In assembling the drag is placed in a pit approximately 20 in. deep dug in the casting floor. The cores are then placed and anchored with chaplets. The cheek is then lowered into place and the cope set on, the whole being securely clamped down. The time consumed in making ready the flask for pouring is about three days. The flask is weighted down 14 or 15 tons just before pouring.

The patterns are made of 1½ in. white pine and require approximately 10,000 running feet of stock for a set of four patterns and the necessary core boxes. Those in use at Ansonia were made by the Hartford Pattern & Model Co., Hartford, the time consumed in this work being about two and one-half months. At the Fore River works, the upper half of the turbine castings are braced by seven 1¾ in. staybolts, and the lower half by one. In both instances the bolts are provided with inside as well as outside nuts to guard against internal and external collapse. The two castings are held together by 1¼ in. bolts.

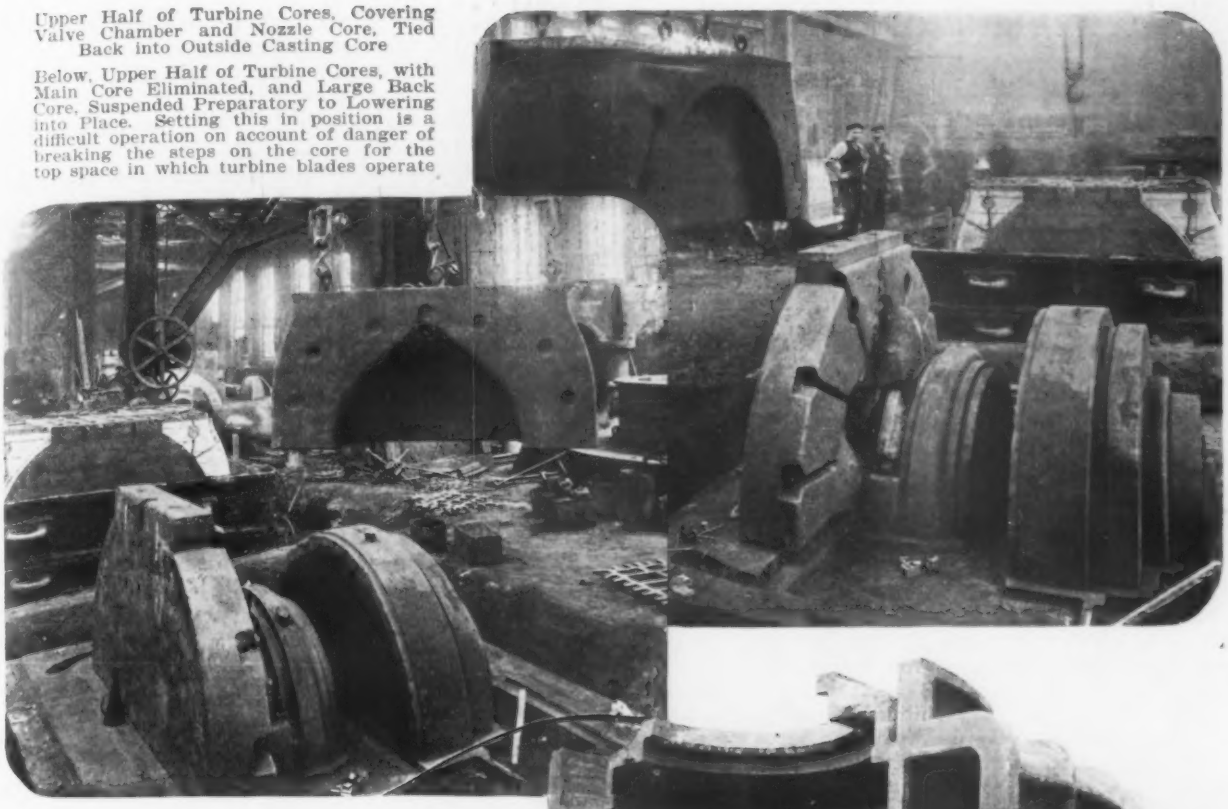
Non-Ferrous Electric Furnace Built by Students

A 60-kw. electric brass melting furnace of 200 lb. capacity, designed, built and operated by students, has recently been installed in the chemical engineering laboratories of the College of Engineering, University of Wisconsin, at Madison. This is believed to be the smallest commercial furnace of this type in the United States, and the state university is the only institution of its kind which possesses such a unit.

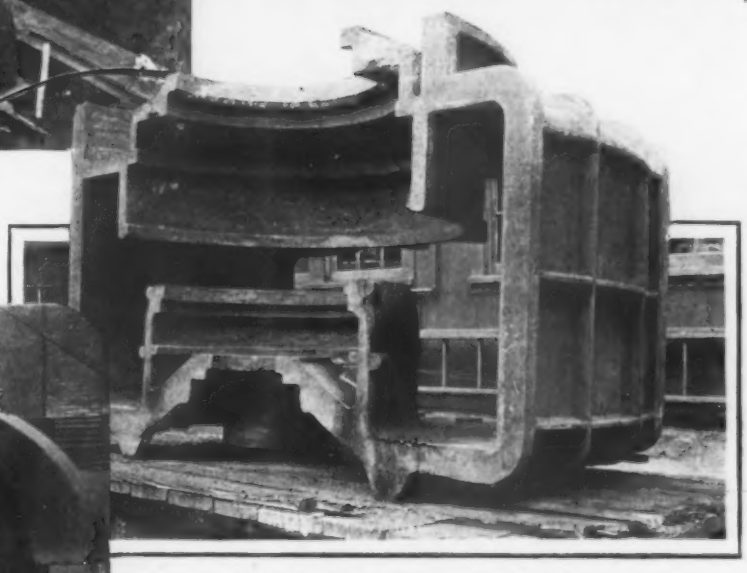
The shell and driving mechanism were made in the university mechanicians' department; the fire sand was produced in an electric resistor furnace in the chemical engineering laboratories. The foundation and lining were built entirely by students. The actual cost was $350, compared with a market price of $1,000 for a commercially manufactured unit.

Upper Half of Turbine Cores, Covering Valve Chamber and Nozzle Core, Tied Back into Outside Casting Core

Below, Upper Half of Turbine Cores, with Main Core Eliminated, and Large Back Core, Suspended Preparatory to Lowering into Place. Setting this in position is a difficult operation on account of danger of breaking the steps on the core for the top space in which turbine blades operate



Below is the Lower Half of Turbine Casting with Main Core in Place. In the back core suspended in air are the steam ports



Interior View of Completed Casting

At Right Is Exterior View of Completed Casting

The furnace will melt copper, brass, bronze, zinc, tin and practically any non-ferrous alloy at a rate of 200 lb. per hr. and is of the rocking type. It is being operated several days a week throughout the summer session and handles a small volume of commercial alloy casting work for foundries in Madison which possess no such facilities.

The design and construction of the furnace was a development of the work of the chemical engineering laboratories at Wisconsin University, which are working on electric furnace processes in recognition of the need of conserving coal, oil and gas, and the greater efficiency obtainable from the electric furnace in comparison with fuel-fired types.

First Electric Steel Furnace for the Philippines

According to the American Chamber of Commerce *Journal*, Manila, P. I., the Atlantic, Gulf & Pacific Co. will have its electric steel furnace completed in the near future. It is the first installation of its kind in the Philippine Islands and will be used for manufacturing steel castings for cars for carrying cane sugar.

WHEELING OPERATIONS

Many Plants Still Idle—Resumption May Be Complicated by Union Labor Problem

WHEELING, W. VA., July 25.—Operations of the steel plants in this district remain at an extremely low notch and the promise is not very bright for an early revival. At the present time the activities of the Wheeling Steel Corporation are entirely centered at the Steubenville, Ohio, works of LaBelle Iron Works, where eight sheet mills, a jobbing mill and four open-hearth furnaces are in operation. The plant of the National Tube Co. at Benwood, W. Va., just outside this city, is entirely suspended and other plants of the Steel Corporation near here are down or running at a very low rate. As far as Wheeling proper is concerned, the issue is whether the plants will be operated on a closed or an open shop basis, and even with the receipt of orders it is doubtful whether some of the plants of the Wheeling Steel Corporation could be started without labor troubles.

It seems that before the formation of the Wheeling Steel Corporation two of the constituent companies, the Wheeling Steel & Iron Co. and the Whitaker-Glessner Co., worked under an agreement with the Amalgamated Association of Iron, Steel and Tin Workers, while the other subsidiary, LaBelle Iron Works, operated on an open shop basis. It is said that while the Wheeling Steel & Iron Co. and Whitaker-Glessner Co., as individual companies, were prepared to participate in the wage conference with the Amalgamated Association, and to renew the agreement, officials of the Amalgamated Association insisted upon the Wheeling Steel Corporation signing the agreement as a unit. This would have unionized the plants of LaBelle Iron Works without effort on the part of the Amalgamated Association and the result was an impasse. Neither the Whitaker-Glessner Co. nor the Wheeling Steel & Iron Co. was represented at the wage conferences, first at Atlantic City and later at Columbus, Ohio. Consequently these companies have not renewed their agreements with the Amalgamated Association.

Notices have been posted at the plants affected to the effect that the company hereafter will deal only with its own men. The notice also states that the scale of wages will be the same as that paid in mills operating under an agreement with the union. It can hardly be said that a strike exists for the reason that the Yorkville, Ohio, plant of the Wheeling Steel & Iron Co. and the several plants of the Whitaker-Glessner Co., which have been operating as union mills, all are down at the present time. No doubt a strike will be called by the union officials on the first attempt by the Wheeling Steel Corporation to start up at the affected plants. A test probably will not come for a few weeks at least, because current demands for sheets and tin plate are not especially large or urgent, and in anticipation of possible trouble, fairly large stocks were accumulated and these are likely to be ample to meet such demands as come out in the near future.

Plant Operations

The Remy electric division of the General Motors Corporation, at Anderson, Ind., has resumed operations with nearly 1000 employees.

The plant of the McGuire Car Works, Paris, Ill., idle since the close of the war, will be reopened, it is announced, a large order having been booked for cars for the Detroit municipal traction line.

The Clark Brothers' Bolt Co., Milldale, Conn., plant has resumed operations following a period devoted to inventory.

The Peck, Stow & Wilcox Co., Southington, Conn., tools, employing approximately 700 hands, has resumed operations after a shutdown of two weeks for inventory.

Operations have been resumed at the plant of the Velco Mfg. Co., Greenfield, Mass., broaching machines and broaches, after two weeks' shutdown. J. T. Sellar is general manager.

The Bristol Brass Co., Bristol, Conn., plant, closed for several weeks after running on short time for nearly a year, has resumed operations in several departments, with prospects of an increase in the near future to nearly normal capacity.

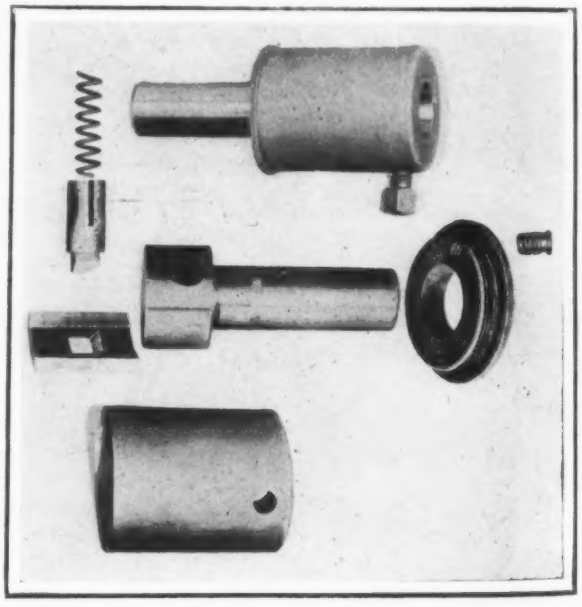
The Production Machinery Co., Greenfield, Mass., foundry, after a period of inactivity, has resumed operations with reduced forces, having secured considerable lawn mower castings business. Molders are receiving 40c. per hour for eight hours' work and extra compensation for overtime. This price compares with 90c. an hour in 1920-21. The company's machine shop remains closed.

Prospects for reopening important Greenfield, Mass., plants August 1, as anticipated July 1, when they closed, are not especially bright. It is estimated some 2000 are out of employment in that city, as against 700 during June. That the number is not larger is due to the fact that hundreds formerly employed in shops have secured work on New Hampshire, Vermont and Massachusetts farms and in cotton and woolen mills. On Jan. 1, 1920, Greenfield had a population of 15,462. The increase between that date and Jan. 1, 1921, according to unofficial estimates, has been lost and more too.

The Rowe Calk & Chain Co., Southington, Conn., following a shutdown of several weeks, has resumed operations on a 10-hour per day, six days per week schedule. The company has sufficient business on its books to keep the plant operating on this schedule for a period of three months.

New Clutch Tap and Die Holder

A new clutch tap and die holder exceedingly simple in design and containing only eight parts, but embracing all the features found in the company's old tool of this type, has been brought out by the Warner & Swasey Co., Cleveland. The new tool holds either



The New Warner & Swasey Holder May Take Either Right or Left Hand Taps or Dies

right or left hand dies or taps, making it two tools in one. To change from right to left a screwdriver is the only tool needed. After releasing one small tightening screw the change can be completed with the hands.

The difference in the tool when used for right and when used for left hand work is in the position of the pawl. To change from one to the other the pawl is turned half way around in its hole. A small pin holds the pawl in the position placed. When threading, the pawl holds the tool rigid by a metal to metal contact until the turret stop is reached, then the head moves forward on the work, pulling the cam over the pawl. This releases the head and allows it to revolve freely. The spring cushions the pawl so that the release is without a jar and practically noiseless.

Explosion Hazard and Its Prevention

Analysis of Characteristics of Fuels and Other Combustible Materials, with Special Reference to Powdered Coal Installations—Explosive Mixtures and How They Are Formed

BY JOSEPH F. SHADGEN*

VERY early the oil industries recognized the danger in connection with mixtures of vapors with air, and to-day all installations using combusible liquids are designed according to an accepted safety code, based on the same principles that guided the gas industry. All leaks are carefully avoided, and stop valves and automatic cut-off valves are provided to isolate lines, to separate units in case of danger. Under no circumstances are open tanks, permitting free vaporization, permissible. All pipes should be completely filled with liquid, and the formation of air pockets or dead holes should be impossible in the complete circuit of pipe lines.

Liquid fuel has been applied in a diversity of industries in connection with its production (refineries, etc.) as well as its uses (heating and combustion) for a period of time long enough to permit the development of the well-known requirements of the underwriters and insurance companies on the subject. Application of the lessons learned from accidents have served to reduce the risk. The fact that liquid combustibles are extensively used in internal-combustion motors, using the explosion of fuel-air mixtures, helped considerably to create an early understanding of the problems involved. In other words, the question was carefully studied for immediate utility and economy of use, which incidentally spread the realization of the dangers involved and called for methods of prevention.

Under this heading falls also the hazard in connection with sewers. Sewer pipes are built for a maximum flow, which seldom occurs, and therefore the lines are most of the time only partly filled with the soiled liquids to be disposed of. From the nature of the refuse waters, putrefaction may set in or vaporization may be produced, which both create dangerous air mixtures liable to oxidation. In case of ignition from any source, be it a glowing cigar stub dropping in through a manhole opening, a lightning spark or any other irony of fate, accidents may become inevitable under favoring circumstances. Such an accident occurred in New York in a sewer fed by the off-waters of a district where a large number of garages were located. The curative medicine will be quick removal of the air mixture, together with the water, to avoid accumulation in dangerous quantities, and the preventive medicine will be purification of the waters in the feed lines before reaching the main line, by syphons, separating or neutralizing the soiling oils that create the hazard.

Solid Explosive Mixtures

Dangers and risks in connecton with mixtures of air with finely divided solid materials of inflammable nature, or liable to oxidation, are not so obvious. Everyday familiarity with dust and the general ignorance concerning accidents create a sentiment of false safety that is the cause of general carelessness, or rather the ordinary underestimation of hazards really existing with fine dust and air mixtures. As knowledge and realization are the first steps to prevention, the Federal authorities have started an educational campaign to familiarize the industrial public with the hidden danger. After interest has been aroused, financial inertia will be overcome by the simple argument that all preventives are in the long run very profitable.

Most dust problems have also a hygienic side, as the majority of dusts are injurious to health. They are also very undesirable from the mechanical standpoint, as finely divided materials often are abrasive, and thus increase maintenance and lubricating costs. Elimination of all dust was first studied from these angles, as they were considered the main objections. They still remain the principal aims in installations dealing with dust or fine powders that cannot combine with the oxygen of the air.

In all other cases the explosive hazard has been pushed to the front, mainly on account of the enormous damage caused in case of conflagration. The annals of industries like coal mines, flour mills, sugar refineries, starch factories, relate scores of disasters due to explosions of dust mixtures. A kitchen-ware factory was recently the scene of a serious accident in its buffing department, where very fine aluminum dust exploded in an exhaust fan. Coal mines have always fought the dangers due to the fine coal dust, and the mining authorities of all countries have devoted an enormous amount of time and money to safeguard them. That pulverized fuel plants have to be designed to cope with these problems is obvious. Recurrences of such accidents must be made impossible by all means, in order not to compromise the future of this very efficient method of burning solid fuels.

In all industries producing impalpable powders the existence of dust and air-dust mixtures is inevitable. The contamination of the neighborhood by the dust should be minimized either by loose hoods over the machines or, better, by a completely tight design with no connection with the outside air. Even better is the solution when crushing, pulverizing, grading or mixing apparatus is installed to work under a slight vacuum, to render impossible all escaping and spreading of dust. Such machines are now on the market, and as they are superior from the safety standpoint, their use should be favored.

As pulverizing plants for the mechanical preparation of fuels have been largely standardized, as all operations are automatic and as all handling is done mechanically, preventive design is relatively simple. All elevators should be of inclosed type, all conveyors should be covered, all pulverizing mills of dust-tight design, mostly operating under vacuum. The only open machines used are the crushers, which really produce so little fine dust that they can hardly be called dangerous, although a hooded construction may be recommended.

Factors Governing Inflammability of Dusts

Before attacking the question of dust mixtures, it seems logical to study first the various characteristics of powders, and to analyze the factors governing their inflammability.

Of greatest importance is the fineness of the dust, for the simple reason that this fineness determines the surface of contact between material and air. Coarse material, furthermore, does not permit an intimate mixture, as the difference in specific gravity between solids and air produces a quick deposit. The fineness of a powder is characterized mostly by a sieve test, or what the author proposed to call a factor of fineness. Pulverized materials coarser than 60-mesh present no danger at all, but the fine particles passing the 100-mesh sieves do, and the impalpable powders, passing through the 200-mesh sieves, present so large a surface of contact as compared with their volume that the chemical affinities are hardly interfered with by the physical form of the material.

This leads to the natural conclusion that the finer the dust the greater the precaution needed. Practical experience confirms this rule every day. Crushing plants are not considered dangerous at all, while pul-

*Consulting engineer, New York. The article is concluded from page 130.

verizing or milling plants are rightly so considered, and equipped with all preventives to avoid dust-air mixtures.

The dryness of the powder is the second factor of importance, which is closely linked to the fineness. Moisture has to be excluded in some processes for the production of very fine materials to obtain economic conditions of production. Even a small amount of water produces coagulation of the dust to larger volumes by reason of adhesive surface tensions between material and liquid. These moist balls hinder the screening operations and reduce the capacity of production by dry-milling machines, and naturally reduce the relative surface of contact between material and air. Hence in all wet processes dust presents no dangers; only in installations dealing with dry and impalpable powders does the possibility of quick reactions exist.

The third factor governing the inflammability of a finely pulverized dry material is its nature itself. Some materials are easily combustible, others are hard to burn, and this relative eagerness to combine with oxygen influences the possibility of trouble. In other words, the intensity of the chemical affinity of the material for oxygen is a decisive factor. An expression of this force may be the heat generated per molecule-gram, as given in Table 1. This shows aluminum oxidation to be the most intense, with phosphorus a close second, and the various hydrocarbons near the top of the list. An aluminum explosion will be extremely destructive because of the great heat generated, and sugar, flours or starches, being mostly made up of hydrocarbon combinations, will create disasters.

Nowhere has the writer found this reasoning applied for gaging the inflammabilities of solid materials. It applies to coals, in particular to finely pulverized coals. As coals are heterogeneous solids containing, besides carbon, hydrocarbons of various composition and impurities of mineral nature, their reactions of combustion are the composite oxidation formulas of the different ingredients. It has been found in laboratory tests that finely divided dry coals and high volatile coals are more liable to explode than low volatile.

L. D. Tracy's report of December, 1919, of the Bureau of Mines, brings out this point very clearly, as the following quotation proves: "From experiments made with the Fraser apparatus it was believed that the division point between inflammability and non-inflammability would be found in dust containing between 10 and 15 per cent volatile matter." In other words, finely pulverized anthracite containing less than 12 per cent volatiles are inexplosive. This may not be absolutely true, as other factors interfere, and the Bureau of Mines would render the industries a real service by making a series of tests under comparable conditions, with varying factors of fineness, with a series of coals from various fields of origin and of typical analysis.

Dealing With Coal Dust Mixtures

Having determined the inflammability of the material itself, and the factors influencing the intensity of the reactions, the mixtures of those powders with air must be studied, and the method of propagation of the flame within those mixtures. The practical value of exact knowledge on this subject cannot be denied, especially on account of its influence on the safety of underground coal mines. The trap-like conditions in mines, with only one or two connections with the outside world, make it imperative to protect the worker by all means, and to reduce all hazards to an absolute minimum. Numerous accidents drew the attention of the authorities of all nations to this vital problem, which resulted in the experimental stations in Lievin, France; in Frameries, Belgium; in Altoft, England; in Babitz, Austria; in Gneisenau, Germany, and in Pittsburgh, Pa.

Valuable investigations on all phases of the problem were made by the best minds of each country. Most of the results were obtained in large galleries, where the explosion was started by the ignition of a small capsule of dynamite that stirred up the coal powder lying in shelves and produced the dust-air mixture. The original ignition was propagated or died out according to the circumstances. The results may be summarized for the purpose of this study as follows:

1. Very small quantities of coal dust will form an inflammable mixture.

2. The coal dust has to be well mixed with the air so as to float or to produce a cloud. This expresses the uniformity of mixture that characterizes all mixtures, as seen above. For mixtures of solids with air, the difference in specific gravity requires a certain agitation to obtain that effect. Practically, air currents of all natures, or previous explosions, produce that agitation. If the mixture is quiet, the coal dust separates by gravity in the form of a deposit and becomes harmless, the surface of contact between coal and air being reduced to such an extent that no quick reaction can take place. If the velocity of the air currents carrying dust is smaller than 1 meter (39⅜ in.) per second, the flame is extinguished, while currents above 4 meters (13 ft.) per second move the dust too rapidly to permit continuity of ignition.

3. The source of ignition has a great bearing on the inflammability of the mixtures. The higher the temperature of the igniting medium, the easier the mixture will respond. If the start is accompanied by a concussion, producing whirls, eddies or currents, the inflammability is greatly increased and the danger is multiplied many fold. For instance, a mixture of finely pulverized sugar with air propagated the combustion, with an arc lamp at a density of 72 grams per cubic meter, with a kerosene lamp at 180 grams per cubic meter and with an electric spark at 370 grams per cubic meter. (Respectively, 0.072, 0.18 and 0.37 ounce per cu. ft.) The ignition temperature of the sugar has previously been determined to be about 425 deg. Cent. (about 800 deg. Fahr.). This example shows the great influence of the nature of the ignition starting the phenomena. Our knowledge on this phase of the problem is still very fractional, but laboratory tests and investigations duplicating practical conditions are being made, and it is to be hoped that results will soon be available.

4. The cloud density or ratio of coal to air is most important. If the cloud contains too much coal, the presence of the solid checks the flame, and too much air kills the propagation for lack of combustible. In other words, there are an upper and a lower limit of inflammability for each solid material mixture, just as for gas mixtures. This varies with the nature of the coals. For anthracites with 15 per cent volatiles it has been found that 1 lb. of coal dust to 120 cu. ft. of air is the higher limit, and 1 lb. of coal dust to 220 cu. ft. is lowest limit; while for bituminous coals containing 30 per cent volatiles, 1 lb. to 60 cu. ft. of air is the highest limit and 1 lb. to 400 cu. ft. of air the lowest limit. These data must be considered as purely indicative, influenced by volatile matter content, dryness and fineness. For comparison it may be assumed that each coal requires 150 cu. ft. of air per pound for theoretical combustion.

5. The propagation of the flame takes place at slow velocities that vary with the cloud concentration. These velocities never exceed 1 meter (39⅜ in.) per sec., no matter how correct the agitation and uniformity of mixtures are. Mallard and Le Chatelier consider the propagation of the flame to be a complex function of the temperature of combustion, the temperature of ignition and the distillation of volatile matters contained in the dust. This last factor means the case of gasification of the hydrocarbons, which adds more or less to the mixture and creates most important side effects. The observed flames are mostly lazy, and contrast distinctly with the vivid aspects of the same phenomena in connection with gas mixtures.

6. Presence of foreign matter accelerates or retards the propagation of the flame, according to its nature. Water and mineral dust work against the phenomena, and porous surfaces and the presence of gases increase the original intensity.

7. Higher temperature of the mixture influences very favorably the oxidation effect, and considerably increases the liability to inflammation.

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Lower Freight Rates and Lower Steel

Few will dispute the justice in the demand of the railroads that they be allowed the benefit of the advanced freight rates and the reduced wage scales for a period long enough for putting their houses in order. The plea of the railroads that when the time comes for a rate reduction it should not be a horizontal or flat reduction is also reasonable and that opinion we have expressed heretofore. But some of the propaganda the railroads are putting out on the subject of freight rates is not likely to help their case. Whether in the publications issued directly by the railroads or in statements of their executives or otherwise, it must be said that there is altogether too much effort to show that the present rates mean only a few cents on a pair of shoes, a barrel of flour, a suit of clothes or a dozen lemons, while reference is carefully avoided to such commodities as iron, steel, coal and coke, on which freights are now so high as to be an obstacle to recovery from the depression.

Producers of iron and steel are losing money on every ton of material sold to-day. They feel that they owe something to their workmen, and in some cases they are able to get business at prices entailing less loss than would come from a complete shutdown. But there is a freight charge of $10 in assembling the materials for a ton of pig iron, and in some producing sections it runs higher. With pig iron selling at from $18 to $20 at furnace for the more common grades, there is left only $8 to $10 to cover the primary costs of the materials, depreciation, labor and all other expenses. It does not make any difference that many blast furnaces are idle to-day and that not much iron is being produced; for the ore that is being used and that will be used during most of the remainder of this year is "loaded" with present freight rates and such fuel and limestone as are being used or are on the furnace yards are loaded in the same way.

Labor costs and market prices have been reduced steadily in iron and steel in the effort to get the market down to levels which will stimulate demand. But it is unfair that labor and capital in this industry should stand the whole burden of the deflation. Freight rates should bear part of it. Such a reduction would help appreciably in bringing steel and iron prices down to levels where more business would be done. The railroads would benefit in buying steel at lower prices and would profit also by the increased traffic that lower steel prices would produce.

There should be no overdoing of the poverty plea of the railroads as a means of delaying needed reductions of rates on coarse freight. They have profited by the weeding out of unnecessary workers. The latest statements of earnings give encouraging proof of this. Higher man efficiency has worked savings of greater significance in many instances than those due to the wage reductions of July 1. Railroad executives have not been disposed to gainsay the claim of many shippers, made when the 40 per cent advance in rates became effective, that to raise freights on mineral and other bulk traffic by that amount was a serious injustice. With so much at stake, early consideration should be given to righting that injustice.

During the war, particularly in 1916 and 1917, the world's supply of zinc came almost entirely from the United States. The American zinc industry then enjoyed a prosperity unequaled in its history and unsurpassed in any other country. While the present depression in that industry is due to a large extent to the inactivity in galvanized sheets and brass products, the decline in foreign demand is no small factor. An examination of export statistics shows, however, that foreign demand for zinc in recent months has been heavier than before the war. In 1913 exports of American zinc were 15,365,324 lb., but for the eleven months ended with May of this year they were 39,831,883 lb. This is over two and one-half times the 1913 rate, though only a fraction of the 1917 total, 403,919,783 lb., representing the peak of the war demand. Great Britain has been the chief purchaser since the war, with France and Japan ranking next, but German competition is now being felt and American exports in May fell to 135,365 lb., of which 112,000 lb. went to Japan. The paralysis of British industry had stopped pur-

chases from that quarter. Undoubtedly the domestic zinc industry will revive with any improvement in business, but it is hardly likely that foreign demand will equal that before the war, with the revived German and Belgian zinc industries as competitors. England is already buying from those countries, having imported 18,913 tons from Germany and 5800 tons from Belgium in the first half of this year and only 274 tons from the United States.

Steel Mills in the Running

With a steel demand in the past few weeks equal to not more than one-fourth of the productive capacity, it is a notable thing that nearly all steel mills stay in the running. A few plants have closed for indefinite periods, but they are the smaller ones in all cases, such as have closed in past years when the decline in demand was much less extensive. The mills that have made no steel at all in the past 30 days probably do not represent more than about 10 per cent of the total capacity at the outside.

Obviously mills are not staying in business in expectation of making profits at this time. Production is at very high cost when the rates of output are so low, counting as cost simply the items of expense that would be eliminated by a complete closing. The overhead expense which would have to be stood in any event is of course a large item. The steel makers, however, have exhibited quite a different spirit from that shown in some other lines of industry in the past six months, where manufacturers have quit production, apparently piqued because they could not secure profits to which they had come to believe they were entitled.

To the steel industry as a whole, considered simply as a going concern, it no doubt would be advantageous if some mills withdrew altogether. The others would have a larger operation and could produce more cheaply. The large steel mills, however, show no disposition to make contributions of this sort. They wish to retain or build up clientele, and wish to give their employees such work as can be provided for them.

While the disposition of steel mills to stay in the running is conspicuous, there is seen another outstanding feature when comparison is made with the spirit that actuated manufacturers in many lines a quarter century or so ago. Those were the days when "destructive competition" or attempts at destructive competition were not uncommon. Some manufacturers then had the notion that if there was not enough business to go around a solution was to reduce the number of competitors. It was a short-sighted policy, and that is one reason why it was abandoned. It was possible in some cases to destroy a competitor, as a solvent corporation, but that did not destroy the plant. The promoter might come along, raise a little working capital among the townspeople by promising that there would be payrolls, and set up competition that had no regard for actual cost, and belonged to the general class known familiarly then as "bankrupt competition." In these more enlightened days there is no likelihood of there being "destructive competition" in steel or any other important commodity.

The steel industry is not making profits these days, but the average producing company is probably losing less than it would lose if it stopped entirely and met its fixed expenses by drafts upon surplus, and the probability is that this will be continued. As time passes the period is being approached, whenever it really is to come, that will see a materially heavier operation, and meanwhile costs are being reduced. At the farthest the time will be short compared with the preceding period of large earnings and each mill is disposed to continue actively in business until that time arrives.

Prosperity and Prices

In the past few months frequent references have been made by speakers and writers to the clash between the older and newer generation of business men in the past few years on various subjects of policy, arising from the divergence in training. While there have been numerous fluctuations, the general trend of prices was downward from 1865 to 1896, and upward from 1896 to 1920. Naturally men who had their business training in the one period would clash with those who had their experience largely in the other period.

The older generation had seen that it was a bad thing to mortgage a property or issue bonds. As values declined the obligation became a heavier and heavier burden. The newer generation found that the simplest way to make money was to borrow money and buy a property, payment proving easy if good judgment had been used in the purchase and the subsequent development. In the 1896 political campaign much was heard of "bloated bondholders" who were thought to be getting more than they really ought to get. In 1920 the bondholder was pitied, like the college professor, and promises were made that the cost of living would be reduced.

The tables had been turned. A vital question to-day for forward-looking business men is whether the tables have been turned again. Prosperity is not connected directly with either rising prices or falling prices, but for the individual is determined by the relation between income and outgo. The older generation was filled with the idea that producing at lower and lower cost resulted in prosperity, the newer generation that selling at higher and higher prices results in prosperity. Neither was right, of course. Profits can be made both when the general trend of prices and values is downward and when that general trend is upward. The individual should first decide which way the general trend is likely to be, and then adopt a system of conducting his business that will suit the expected trend.

While prosperity and an advancing market are associated in the average mind, one can scarcely avoid confessing that, viewed in the abstract, falling values furnish in the long run an incentive to men to work hard and efficiently. The years in the eighteen-nineties, following the Baring failure, brought declining prices for iron and steel. They

were also years of new and marked economies in the making of pig iron and steel. It is true, of course, that the fear of declining prices causes buying to be postponed and influences men to defer the inception of construction projects, just as the expectation of higher prices influences them to place orders and make contracts. It is to be noted, however, that it is not the higher prices but the expectation of the higher prices that induces men to buy or contract. This is an important difference and one that has been overlooked by those who noticed before the war that more construction work occurred when prices were at their higher levels than when they were at their lower levels, but did not ascertain that many of the contracts covering the construction had been made long before, in a period of low prices.

Many of the older generation of manufacturers and merchants found that money could be made even when the general tendency of prices was downward. Employment is the great essential. Once the amount of unemployment begins to decrease, the spending power is increased and that results in more employment. When falling prices are not causing an increase in unemployment they are not doing much harm. In the present movement they may have done their worst in that respect already.

The world-wide slump in demand for steel is clearly reflected in the American and British export data for May, the latest figures. British steel exports in that month fell to 99,000 gross tons, or about one-third of what they were in May, 1920, and only 24 per cent of the May movement in 1913. In the case of the United States, the May steel exports were only 104,000 tons or about 50 per cent of the 1913 rate and only 25 per cent of the 1920 exports. Taking the combined exports of these two countries as representative of present world demand, the May total of 203,000 tons compares with a monthly average of 684,500 tons in 1920 and of 655,100 tons in 1913. This is a falling off of over 66 per cent in either case. It is worth noting also that the combined exports of the two countries in 1913 and 1920 were about the same, with the exception that of the total the share of the United States in 1920 was about 60 per cent, whereas in 1913 Great Britain's proportion was about 62 per cent. At present the exports of the two countries are on about the same level. What this relation will be in the coming months depends on many conditions too uncertain to forecast.

German Competition in Japan

WASHINGTON, July 26.—German makers now are bidding on contracts for machines, tools, etc., in Japan, at prices from 30 to 50 per cent cheaper than American quotations, according to a report received by the Bureau of Foreign and Domestic Commerce. While the consumer has to agree to pay any export tax levied by the Allies, it is stated that, even if such a tax is as high as 25 per cent, prices of German materials will be less than for similar articles of American manufacture. This being the case, it is declared that to hold the market in Japan or to extend it, price reductions by American manufacturers will be necessary.

CORRESPONDENCE

The British Coal Strike Settlement and Domestic Labor Problems

To the Editor: The struggle between the British public and its Government on the one hand and the miners on the other in the attempt of the latter to effect nationalization of the coal industry has been watched by the writer, keeping in mind that though separated by thousands of miles this country had a lively interest in the outcome.

The *Coal Trade Bulletin* states that in the settlement the miners have gained a profit-sharing plan by which 83 per cent of all money earned after all charges have been paid is to be given to the worker and 17 per cent to the owner. While the fight for nationalization was lost, the miners can afford to discount that almost 100 per cent, as they secured the further concession of a subsidy of £10,000,000 to tide them over the low-wage period. This in itself is a great step toward socialization.

Of course, the leaders of the United Mine Workers of America have followed closely this controversy and will consider its outcome as altogether satisfactory. They no doubt feel that their stand against any reduction in wages, when that question again comes up for adjustment, will be greatly strengthened in that any terms will be acceptable to the owners in preference to combating an effort to nationalize our mines.

One daily paper remarks: "Should profit sharing solve the British coal mining problem enormous impetus will be given the movement generally." But it will not. Even if the miners had succeeded in imposing nationalization on the British public the problem would not have been solved. There are two reasons for arriving at this conclusion.

Whenever any class is persuaded that it is not getting all that is coming to it invariably the pendulum swings to the other extreme and, no matter what is conceded, it believes that something is held back or there is still more to be desired. This was illustrated in this country in connection with the Adamson law. If any of your readers had an opportunity to converse with individual members of the Big Four, how many were found that were satisfied with what they got?

The other reason is one which the leaders themselves failed to foresee, or if they did we must assume their advocacy of nationalization to have been dictated from motives of expediency if not solely a threat. If the industry were nationalized and there were no longer any owners against whom the leaders could direct that spirit of unrest and discontent which they have fostered, the attention of the workers would be focused upon these same leaders with unpleasant results. Their position eventually would become untenable because no condition which they succeeded in creating for the worker, whether it be nationalization or on the line of the present agreement, could secure uninterruptedly the benefits which have been so readily promised.

In view of the still insecure foothold which the doctrines of confiscation of private property and wage subsidizing have in this country, it is exceedingly doubtful that the United Mine Workers of America will do any more than threaten to make either an issue at present. Before the British plan can be used as a real argument on this side of the water we shall have observed its failure as a solution of Britain's coal mining problems or other labor troubles.

H. D. MURPHY.

Medford Hillside, Mass., July 19, 1921.

The cold-drawn department of Ellwood Works, National Tube Co., Ellwood City, Pa., has been awarded the prize for ranking first among the 139 plants of the Steel Corporation in safety work. This department has not had a lost-time accident in the past 20 months.

FOREIGN RAILROADS BUY

Chile, China, Morocco and Soviet Russia Active —Bolivian Projects—Belgian Iron Imported

NEW YORK, July 26.—While Japan and the Far East continue to improve from the standpoint of taking exports, the lower prices prevailing in Continental countries, although they exclude selling of American products, are enabling those exporters that have turned to importing under present conditions, to put down European material at American ports at sufficiently low prices to interest consumers here. The tendency in transactions of this kind is to deal entirely in dollars in order to avoid possible losses through the fluctuation of exchange. Despite the continued decline of pig iron in the three principal producing countries on the Continent, prices put down at ports on the Atlantic coast are still too high for even limited business, but with the high freight rates from Eastern furnaces to the Pacific coast, exporters in New York, who have taken over the representation of Belgian and German furnaces are finding it possible to deliver Belgian foundry iron, c.i.f. Pacific port, as low as $26 per ton. Little competition from this iron appears possible in the East, however, as the lowest quotation at present is in the neighborhood of $24 per ton, c.i.f. New York. One sale of 150 tons of Scotch iron from a Belgian furnace is reported to a California consumer.

Although stocks of canceled material at South American ports are still large and exchange rates generally show a decline, inquiries and orders from South American markets show a marked increase over conditions of a few months ago. Exporters with connections in Porto Rico report a fairly active demand for sheets and bars from this source. But orders are generally small and include a wide range of sizes, evidently being purchased for stock. An old 1000-ton inquiry for 35-lb. rails issued by a large sugar centrale at Manila has been revived and new quotations requested.

Chile in Market for Annual Rail Purchase

Foreign railroad buying continues to lead in export activity. An inquiry is in the hands of the New York office of the Chilean State Railways, 141 Broadway, calling for 12,000 tons of 90 to 100-lb. rails, switches, bolts, fish plates, crossings, frogs, etc. for 5-ft. gage track. This is the annual requirement of the railroads and will be closed about the end of August. Previous rail purchases made by the Chilean railroads have been placed either in the United States or with British mills.

The contract received by the Ulen Contracting Corporation, 120 Broadway, New York, from the Bolivian Government, reported in THE IRON AGE, July 21, calls for the construction of 128 miles of railroad from Atoche to Villazon. This will be a connecting link in trans-continental railroad construction that will give a complete coast to coast railroad of one gage. To finance this project the Bolivian Government is preparing the issue of $7,000,000 worth of 8 per cent bonds, backed by the entire equipment and income of the Bolivian railroads, with interest guaranteed by revenues from mineral taxation. These bonds will be underwritten by the Ulen Contracting Corporation and floated in the United States. Fred C. Lavis, construction engineer, and Paul C. Campbell, chief engineer of the company, will sail about Aug. 1 for surveys and location of the railroad, on which actual work is expected to begin about Jan. 1. The Ulen company is now finishing a contract for water supply and sewage systems at La Paz, Bolivia.

Rail Tenders from Morocco

It is reported from China that the Robert Dollar Co. has been awarded a contract by the Pekin-Suiyan Railroad for 17,000 tons of 85-lb. rails at a price said to be $38 per ton, f.o.b. New York. The tenders on a large tonnage of 85-lb. rails for the Pekin-Mukden Railroad will be closed this week. In addition to other rail inquiries in the market from foreign sources, the American Consulate-General at Tangier, Morocco, reports that American companies have been invited to submit proposals on 3000 metric tons of 36-kg. (about 72½-lb. per yd.) rails and 8000 pairs of fishplates for the Tangier-Fez railroad. Bids will be opened Aug. 20 by the Commission Generale des Adjudications et des Marches, Tangiers. Blueprints and specifications are in possession of the Bureau of Foreign and Domestic Commerce, Custom House, New York. They call for 5200 rails of 12 meters, 455 rails of 11.97 meters, 900 of 11.94 meters, 160 of 6 meters, 210 of 8 meters, and 210 of 10 meters. Delivery is to be made within 80 days at the port of Kanitra.

A $2,000,000 order for oil tank cars has been received by the Canadian Car & Foundry Co., Ltd., Montreal, from the Russian Soviet Government. The contract, which was obtained by the president of the company, W. W. Butler, while in Berlin in competition with European bidders, calls for 500 tank cars.

Chinese Buy American Copper

A number of orders for electrolytic and casting copper have recently been placed and are still pending from Chinese sources. One exporter, now shipping about 30 tons of casting copper to a Chinese consumer, is bidding on about 330 tons of electrolytic, 180 tons of casting and an additional 220 tons of casting copper for China. American sales of copper to the Orient have been rendered possible through the decline of the domestic copper market to a point where it is possible to bid on a basis as low as 12.50c. per lb. Japanese stocks purchased with copper 100 per cent higher and Australian copper are both unable to compete with the American trade at current prices.

Germany as a Competitor

Following a protracted visit in Germany, Fred Kling, chief mechanical engineer of the Carnegie Steel Co. in the Youngstown district, predicts that Germany is not likely to be a serious competitor of the American iron and steel industry in foreign markets for a number of years.

Mr. Kling points out that Germany lost 30 per cent of her steel making capacity by the terms of the peace treaty and 10 per cent of her population. "Her own reconstruction and the intensive industrial program being mapped out in addition to the relatively larger population to steel capacity, will leave no great tonnage for export—possibly 1,000,000 tons per year against 5,000,000 tons before the war," he states. "Furthermore, it is unlikely that the former German steel plants in French hands will be so efficiently managed for a period of several years at least. When world affairs become normal, there will be plenty of need for American iron and steel."

The Iron Age and Its Readers

Occasionally a reader asks why we do not publish the table of contents on the front cover, as do some other papers. The reason can be made perfectly clear. So much of THE IRON AGE is made up of articles in which the news factor is important, while many of the market pages consist of telegraphed matter which is not in the office until several days after the front cover has been completely printed, that any table of contents printed on the cover would necessarily be incomplete. It could not possibly include the last-minute information, nor could it take account of the fact that frequently, because of the compelling importance of some of this late news, articles which had been scheduled for the issue have to be left out at the last moment, which fact would make a contents page on the cover of no value.

For many months it has been the practice to print, on the upper right corner of the cover, the number of the inside page on which the table of contents would be found. This has proved of great help to those using it.

Year's Iron and Steel Exports About Normal

Heavy Exports in First Eight Months Offset by Later Reductions—Machinery Increases—Imports Fall Off About Half

WASHINGTON, July 26.—Figures of the Bureau of Foreign and Domestic Commerce for June, 1921, completing the fiscal year 1921, reflect an interesting study of imports of iron and steel and exports of iron and steel and machinery, showing that the imports made a large drop, while the exports of iron and steel showed a slight decline and exports of machinery registered a large increase as compared with the fiscal year ending with June, 1920.

Imports of iron and steel for the fiscal year just closed totaled 239,871 gross tons, valued at $44,236,077, as against 489,803 gross tons, valued at $37,423,289, for the corresponding period of last year. Exports of iron and steel for the present year totaled 4,168,619 gross tons, valued at $1,027,976,000, as compared with 4,212,732 gross tons, valued at $932,550,863. Machinery exports for the fiscal year 1921 totaled $441,497,245, as against $397,330,191.

Declines were shown in both imports and exports for June, when compared with May. Imports aggregated only 8,929 gross tons, valued at $2,539,926, as compared with 23,498 tons, valued at $3,144,643, in May. Exports of iron and steel for June amounted to 119,081 tons, valued at $39.975,035, as compared with 142,551 tons, valued at $41,365,886, for May. The imports of June, 1921, compare with 40,554 tons for June of last year, and were valued at $5,268,126, the values in all instances taking into account the entire total rather than merely those included in the tables herewith presented, and figures are given in accordance with revisions by the bureau.

Exports for June, compared with 402,707 tons for the same month of last year, which were valued at $88,787,349, give a clear idea of the decline since one year ago. Exports of machinery for June, $22,044,833, compare with a value of $36,493,736 for the same month of last year, and also show plainly the decrease made. Manganese ore imports for June totaled 17,169 tons, valued at $80,602, as compared with 54,663 tons for May, and for the 12 months totaled 682,770 tons, valued at $10,199,612, as compared with 323,901 tons, valued at $8,086,001, for the fiscal year ending with June, 1920. The sharpest decrease in exports in June was reflected in steel plates, the figure being 7,781 tons, as compared with 18,518 tons in May.

Distribution of some of the principal products, for the fiscal year 1921, was in gross tons in part as follows: Wire nails, 14,023 to Japan; 8,855 to United Kingdom; 8,742 to China; 6,689 to Dutch East Indies; 6,211 to Cuba; 1.744 to Canada; cast pipe, 22,202 to Mexico and 20,003 to Cuba; welded pipe, 154,884 to Mexico; 40,407 to British India; 30,650 to Japan; 25,753 to Dutch East Indies and 20,069 to Peru; steel rails, 79,430 to Dominican Republic; 60,302 to Japan; 56,320 to Dutch East Indies; 49,580 to Chile; 40,186 to China and 24,177 to Brazil; galvanized sheets and plates, 26,019 to Canada; 8,833 to Cuba and 7,610 to Argentina; plates, 183,860 to Canada; 137,718 to United Kingdom; 77,987 to Japan; 52,541 to the Netherlands; 50,940 to France and 45,180 to Italy; sheets, 57,741 to

Imports of Iron and Steel

	Gross Tons			
	June		Year Ending June 30	
	1920	1921	1920	1921
Ferromanganese	5,694	265	38,973	43,197
Ferrosilicon	1,497	520	16,855	7,361
Pig iron	11,036	3,688	126,264	51,757
Scrap	12,106	1,372	202,062	82,657
Bar iron	363	33	3,080	3,815
Structural steel	212	72	1,234	1,394
Billets, without alloys	779	245	68,758	995
All other billets	2,191	51	5,414	3,216
Steel rails	5,876	2,585	23,804	37,583
Sheets and plates	177	48	1,418	2,781
Tin and terne plates	27	26	377	503
Wire rods	596	24	1,564	4,612
Total	40,554	8,929	489,803	239,871
Manganese ore and oxide	80,329	17,169	323,901	682,770

Exports of Iron and Steel

	Gross Tons			
	June		Year Ending June 30	
	1920	1921	1920	1921
Ferromanganese	275	...	2,374	3,335
Ferrosilicon	31	52	398	577
Pig iron	16,799	1,637	245,354	125,629
Scrap	24,153	3,587	81,464	182,478
Bar iron	3,268	326	36,530	38,752
Wire rods	15,134	492	111,823	61,567
Steel bars	53,559	8,009	583,418	468,995
Billets, ingots, blooms	29,811	1,106	288,766	82,549
Bolts and nuts	3,061	1,175	34,910	37,613
Hoops and bands	3,488	1,302	45,188	38,405
Horseshoes	250	32	2,567	1,505
Cut nails	212	29	4,002	3,462
Wire nails	7,808	951	55,681	67,017
All other nails, including tacks	1,663	197	9,745	9,626
Cast pipe and fittings	3,764	4,076	46,415	54,183
Welded pipe and fittings	17,654	25,813	221,064	439,762
Radiators and cast house boilers	338	261	6,745	4,943
Railroad spikes	1,631	699	17,190	14,219
Steel rails	49,620	20,308	553,860	549,558
Galvanized sheets and plates	10,454	2,942	99,313	93,155
All other sheets and plates	3,049	948	33,354	22,722
Steel plates	61,555	7,781	721,828	761,022
Steel sheets	15,383	10,296	151,324	155,841
Ship plates, punched and shaped	1,112	1,951	26,926	32,089
Structural steel	34,669	18,058	339,908	526,482
Tin and terne plates	18,604	2,727	207,296	178,299
Barb wire	8,109	1,757	118,878	86,936
All other wire	17,253	2,569	166,411	167,898
Total	402,707	119,081	4,212,732	4,168,619

Exports, January, 1919, to June, 1921, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
January, 1919	360,456	35,793	11,594
February	234,793	20,178	10,407
March	344,506	22,054	8,176
April	408,204	16,300	11,488
May	447,050	32,233	20,771
June	544,580	39,540	46,016
July	287,823	38,373	21,318
August	396,743	36,071	36,162
September	363,505	18,991	37,513
October	302,456	14,108	20,713
November	295,045	21,429	13,211
December	254,676	14,612	21,538
Calendar year 1919	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
Fiscal year 1920	4,212,732	248,126	288,766
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Calendar year 1920	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142,551*	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921	4,168,619	129,541	82,549

*Revised figure.

Machinery Exports

	June 1920	June 1921	Year Ending June 30, 1920	1921
Adding machines	$ 523,962	$ 239,846	$ 4,325,104	$ 5,978,541
Air-compressing machinery	407,016	292,807	4,371,107	5,675,504
Brewers' machinery	44,274	4,542	334,028	454,099
Cash registers	413,560	165,654	5,551,993	3,805,661
Parts of	74,561	37,613	402,821	407,985
Concrete mixers	55,462	41,102	516,949	1,024,026
Cotton gins	37,651	3,947	302,266	283,726
Cream separators	127,841	32,778	1,133,068	801,851
Elevators and elevator machinery	140,136	188,935	1,976,279	2,024,254
Electric locomotives	.....	252,771	1,464,157	825,753
Gas engines, stationary	50,876	65,173	803,151	643,544
Gasoline engines	2,965,458	699,901	33,190,177	23,526,568
Kerosene engines	1,026,138	7,222	8,543,699	6,235,530
Steam engines	4,509,466	4,336,935	46,381,621	50,265,517
All other engines	337,687	143,329	3,387,579	3,898,616
Boilers	315,853	209,263	6,358,175	8,893,878
Boiler tubes	477,373	165,386	4,459,253	6,614,227
All other parts of engines	1,783,935	713,807	21,763,421	20,363,872
Excavating machinery	158,792	124,573	1,441,857	2,756,581
Milling machinery, flour and grist	117,965	58,198	1,639,948	2,238,374
Laundry machinery	73,950	56,477	1,105,118	1,139,309
All other	77,778	18,956	519,917	827,933
Lawn mowers	34,566	29,710	376,603	584,696
Lathes	846,583	131,140	8,915,519	5,375,690
Other machine tools	1,127,297	267,344	12,950,721	10,060,505
Sharpening and grinding machines	395,903	60,499	4,371,978	2,576,498
All other metal working machinery	1,134,940	1,029,230	22,790,373	16,427,727
Meters, gas and water	57,149	73,302	743,214	805,432
Mining machinery, oil well	419,235	1,234,392	4,195,119	12,007,423
All other	376,508	471,489	8,243,034	9,613,392
Paper mill machinery	185,449	108,908	2,686,274	3,562,585
Printing presses	700,111	357,004	6,283,729	10,383,632
Pumps and pumping machinery	1,130,687	827,624	10,617,940	16,804,050
Refrigerating and ice making machinery	245,045	102,631	2,422,789	3,390,763
Road making machinery	150,952	81,447	1,207,000	1,182,183
Sewing machines	1,188,709	483,820	14,617,065	11,280,128
Shoe machinery	160,067	110,675	2,628,857	2,802,105
Sugar mill machinery	1,010,080	1,596,972	1,547,518	29,108,909
Textile machinery	2,395,800	1,045,095	12,378,115	13,513,228
Typesetting machines	297,022	166,136	3,875,947	4,536,013
Typewriting machines	2,478,623	723,797	23,012,903	18,867,513
Windmills	145,228	84,265	1,419,758	2,762,657
Wood working machinery, saw mill	78,218	54,941	922,838	1,392,454
All other	254,520	110,653	3,319,529	3,835,711
All other machinery and parts of	7,969,719	4,965,949	79,981,888	99,356,649
Total	$36,493,736	$22,044,833	$397,330,191	$441,497,245

Canada; 39,152 to Japan and 13,108 to Argentina; structural steel, 116,159 to Canada; 78,037 to Japan; 59,232 to British India and 50,661 to Cuba; tin plate, 44,107 to Canada; 25,004 to Japan; 13,436 to Brazil and 12,052 to China; barbed wire, 18,537 to Brazil; 13,283 to Argentina and 12,283 to Canada; other wire, 47,842 to Argentina; 24,708 to Canada and 21,156 to Australia.

Meeting Cleveland District, Pig Iron Association

Sentiments that the pig iron market may be at the bottom and that buying may be expected to gradually increase were voiced July 21 at a meeting of the Cleveland District of the American Pig Iron Association, held at the Youngstown Country Club, Youngstown, Ohio. T. W. Friend of Pittsburgh, president of the association presided. John A. Penton, Cleveland, related impressions of his recent trip to Europe.

The inability of Joseph G. Butler, Jr., chairman of the board of directors, founder and for many years president of the organization, to attend was the occasion of many expressions of regret.

Will Handle U. S. Shipping Board Claims

WASHINGTON, July 26.—Unliquidated claims to the amount of $211,000,000 will be handled by the United States Shipping Board Claims Commission whose appointment was announced last Friday by Chairman Lasker of the Board. The chairman of the commission is Judge Walter D. Meals, former associate justice of the Appellate Court of Ohio. The associate members are President Homer Ferguson of the Newport News Shipbuilding & Dry Dock Co.; F. W. Wood, former president of the Maryland Steel Co.; Captain Richard W. Watt, construction corps, United States navy and Arthur W. Teele of the accountant firm of Patterson, Teele & Dennis.

The Truscon Steel Co., Youngstown, Ohio, is erecting a large warehouse in Chicago. Cranes and electrical equipment are now being installed under supervision of G. A. Hughes, electrical engineer.

Tin-Plate and Terne-Plate Manufacture

WASHINGTON, July 25.—A preliminary statement of the 1920 census of manufactures with reference to the tin-plate and terne-plate industry has been issued by the Census Bureau. The bulk of the tin and terne-plate product is made by establishments that roll the black plates, and in most cases the report for the rolling mill carries the general statistics for the dipping department. Only in cases where the dipping plant is separate and distinct from the rolling mill, or the black plates were purchased, was the establishment included in the classified industry, though at previous censuses full segregated reports were made and the dipping departments were included in the classified industry.

Present figures are based upon returns from 43 establishments with products valued at $181,789,200. This includes 23 establishments constituting the classified industry, with products amounting to $97,398,700; 17 dipping departments of rolling mills, with $82,920,700; and 3 establishments primarily engaged in other lines of manufacture, but making tin and terne-plate products to the value of $1,469,800. The foregoing includes 8 retinning establishments with products valued at $143,700, chiefly custom work. At the census of 1914 there were 31 establishments in the classified industry, with products valued at $68,343,000 and 1 establishment making some terne-plate as a subsidiary product, for which figures could not be published.

The increase in value of products, 1914 to 1919, was $113,446,200, or 166 per cent. The production of tin-plate in 1919 was 2,388,867,000 lb., valued at $165,846,100, as compared with 1,901,332,000 lb., valued at $60,258,100, in 1914, an increase of 25.6 per cent in quantity, and in unit value from 3.17c. per lb. to 6.94c. This was chiefly coke plate, the production of charcoal tin-plate in 1919 being but 36,550,000 lb., 19.5 per cent less than in 1914; the comparative unit values being 4c. in 1914 and 8.4c. in 1919. The output of terne-plates was 124,920,376 lb., and 50,860,455 lb. of long ternes, a total of 175,780,800 lb., valued at $11,351,462, a quantity increase of 15 per cent, and in unit values from 3.94 to 6.46c. per lb.

There were used 2,655,481,000 pounds of black plates, all of domestic origin, of which only 1.6 per cent was purchased; 43,897,000 pounds of pig tin, an increase of 20 per cent with respect to 1914; 870,800 pounds of pig lead, a decrease of 62 per cent and 7,687,400 pounds of purchased terne mixture, an increase of 16 per cent. The increases in unit values were, for black plates, 1.9c. to 3.8c.; pig tin, from 39c. to 58c.; pig lead, 4.14c. to 6.3c.; and terne mixture, from 11.8c. to 19.8c.

Tin Plate and Terne Plate

	1919 Quantity, Thousands of Pounds	1919 Value	1914 Quantity, Thousands of Pounds	1914 Value
Total products	.....	$181,789,200	.....	$68,343,000
Tin plate	2,388,867	165,846,100	1,901,332	60,258,100
Coke	2,352,317	162,762,100	1,855,893	58,450,900
Charcoal	36,550	3,084,000	45,439	1,807,200
Terne plate	124,920	8,296,600		
Other sheets (long ternes)	50,860	3,054,900	152,624	6,012,300
Plates redipped and amount received for custom work	.....	177,800	.....	2,072,600
All other products, including tin dross, scruff, scrap, etc.	.....	4,413,800		
Principal Material		Cost		Cost
Black plates or sheets, steel	2,655,481	$100,444,300	2,107,788	$39,803,600
Produced by the establishment reporting	2,612,635	99,123,900	2,084,537	39,335,100
Purchased (all domestic)	42,846	1,320,400	23,250	468,500
Coating metals	52,455	27,124,000	45,430	15,044,800
As purchased:				
Pig tin	43,897	25,545,700	36,543	14,167,200
Pig lead	871	55,100	2,269	94,000
Terne mix	7,687	1,523,200	6,618	783,500
Metal totals:				
Tin	45,659	.....	38,050	.....
Lead	6,796	.....	7,381	.....

Hartford, Conn., structural iron workers have agreed to a reduction from $1.06¼ to $1 per hour, effective at once, following a conference of representatives of employers and employees.

Senate Committee Begins Tariff Hearings

Plans to Expedite Passage of Fordney Bill—Strong Protests Against Duties on Ferromanganese and Manganese Ore—Details of Changes Made by House

BY L. W. MOFFETT

Washington, July 26,
THE IRON AGE BUREAU,
816 Fifteenth Street.

BECAUSE of its desire to report the tariff bill to the Senate and to act on it as quickly as possible, the Committee on Finance expects to devote only two weeks to hearings, which were begun yesterday with the American valuation proviso as carried in the House measure taken up first. Opponents and proponents of this basis of assessing duties will be given until Thursday to present their views. So that duplication may be avoided, the committee proposes that persons desiring to submit their views regarding the same item agree upon one representative and it is planned to devote less than a day to each schedule, hearings on which will be held according to their order in the bill. Many protests against items and provisions throughout the bill already have been received. The duties on ferroalloys and on certain ores, such as manganese, and tungsten are the object of protests before the Finance Committee and it is assumed representatives in favor of and against these duties will appear before the committee. Independent steel manufacturers are strongly opposed to the House duties on manganese ore and ferromanganese and are expected to protest. There is also considerable opposition by steel makers against the duties of ¾c. per lb. on grain magnesite and ½c. per lb. on crude or ground magnesite, left unchanged from the way they were reported to the House.

Proposed Duty on Magnesite

Supporters of the proposed duty on magnesite state that it was originally intended in passing the Underwood bill to put crude magnesite on the free list and have a tariff of 10 per cent on magnesite brick, but a decision put grain magnesite on the free list. Grain magnesite is the prepared calcined material which reduces one-half in burning from the crude material, and magnesite brick are merely formed from this material and re-burnt. So all material came over in this form and no duty has been paid under the Underwood law. The manufacturers contend that the Fordney bill straightens this matter out, as it provides a duty on calcined grain magnesite, so that some revenue can be obtained from this material by the Government and protection can be given the manufacturers who developed material in this country during the war. It is further stated that all of the crude material for magnesite in this country is in Washington or California, and that the tariff asked for on the Fordney bill does not cover the difference in freight from California and Washington to the steel producing districts in Pennsylvania, which is now about $24 per net ton against the present freight rate from abroad of 30 shillings, or about $7.50 per net ton. Therefore, it is asserted, the American manufacturers are asking only for a protection against the difference in freight rate.

The opposition to the duties on fluorspar has been increased as the result of the adoption of an amendment offered by Chairman Fordney of the Ways and Means Committee, which fixes the duty on a net ton basis instead of the gross ton basis, usually recognized in importations, but which was not specifically mentioned in the paragraph as originally drafted. The duties proposed are $5 per net ton, immediately effective, and $4 per net ton after one year following passage of the act.

The bill passed the House last Thursday by a vote of 289 to 127, seven Democrats voting for and seven Republicans voting against it. As stated in THE IRON AGE of last week, changes made in the metal schedule were only of a comparatively minor character. In addition to those published, two others were made, the latter being acted upon during the last day the House had the bill before it when it resolved itself into the Committee of the Whole House on the State of the Union. One of these changes affected the zinc ore paragraph, 390, and increased duties as follows: 10 per cent or more zinc and less than 20 per cent, from ¼c. to ½c. per lb.; 20 per cent or more zinc and less than 25 per cent, from ½c. to 1c. per lb., and 25 per cent or more zinc from 1c. to 1½c. per lb. These higher duties were originally carried in second proviso of the paragraph, which were to apply to the zinc ores for two years beginning on the day following passage of the act, the proviso being struck out. The effect of the change is to make the higher rates permanent. The other change made and not previously noted increased the duty on quicksilver from 7c. to 35c. per lb. This was done on the strength of a letter from Secretary of War Weeks, who pointed out that mercury is necessary to the manufacture of munitions and that the domestic industry, now depressed, partly because of importations, should be encouraged.

Debate on Ferroalloys

The most spirited debate in the House in connection with the metal schedule related to duties on ores for making ferroalloys and on ferroalloys, Representative Wingo, Democrat, of Arkansas attacking especially the duties on manganese ore and ferromanganese, while others also criticised them.

Representative Wingo assailed an amendment made by Representative Tilson, in charge of the metal schedule, adding the words "manganese or silicon" to the alloy steel paragraph 305 providing an additional duty of 15 per cent when the alloying material is in excess of 1 per cent manganese or silicon. Representative Wingo stated that the schedule carried a duty of 1c. per pound on manganese ore or concentrates on the manganese content when in excess of 30 per cent and asked Mr. Tilson if it were the intention to put the same rate on the crude manganese ore as applied to the concentrate. Mr. Tilson said the amendment related only to the metallic content and that if it is a concentrate there is a greater metallic manganese content.

"As a matter of fact, if you put it on the ore which contains a certain metallic content—that is, on a percentage basis—would not the tariff on that be a great deal higher?" inquired Mr. Wingo.

"Well, the freight rate would be more on the leaner ore," replied Mr. Tilson. "The concentrate, of course, would have less weight to pay freight upon than the ore; but the duty is upon the metallic content."

"No, it is on either the manganese ore or concentrate with the metallic content in excess," said Mr. Wingo. "In other words, you might have more than 30 per cent or 31 per cent of metallic ore and yet you might have a concentrate that had an arbitrary figure of 60 per cent. Would not there be a difference?"

"Not at all, because it is only upon the metallic content that the duty is laid," Mr. Tilson contended.

Mr. Burton Receives Protests

Representative Burton, Republican, of Ohio, said that he had received strong protests against duties on ferrosilicon and manganese ores. He said he did not

think these exist in commercial quantities in the United States sufficient to afford more than a bare minimum of supply and consequently was compelled to enter dissent in regard to these duties.

"Again, a very important invention, designated as alpax, has recently been made as a substitute for aluminum, for which ferrosilicon, 95 per cent and more of silicon, is the essential raw material," said Mr. Burton. "I understand that silicon, 95 per cent pure, cannot be obtained in this country. That duty, which, I believe, is 8c. per lb., is sure to be a serious handicap in the manufacture of this new metal, which is a substitute—I do not say it is exactly a substitute—for aluminum. At least it is a very similar metal."

Representative Green, Republican, of Iowa, a member of the Committee on Ways and Means, said the committee would consider a brief of protest if it were presented, stating that the matter of using ferrosilicon for the new substitute had not come before the committee. Representative Burton replied that he had written a letter to the chairman of the committee.

Mr. Burton also said he had received a letter from a maker of high speed tools for which tungsten is a requisite, saying that the tungsten duty amounts to about 300 per cent and might place the maker referred to out of competition in the markets of the world. Representative Cooper, Republican, of Ohio, said he had received similar protests from Ohio steel makers. Representative Timberlake, Republican, of Colorado, a member of the metal subcommittee, attempted to support the rate by saying the cost to consumers would amount to not more than 3c. per ton of steel, and Chairman Fordney made a similar reply. Representative Wingo interrupted to say, humorouly, "I know enough about it to know that when you seek to defend it (the duty) by suggesting that the tax will amount to only a few cents on a ton of steel you might as well say that a tax on feathers would be a tax on angel wings."

Increases of the molybdenum and tungsten content to more than 1½ per cent in paragraph 305 in order to get additional duties of $1.25 and 72c. per lb., respectively, were explained by Mr. Tilson. Like most other amendments, the change was recommended by the Tariff Commission and was made, Mr. Tilson said, because it was found that a number of steels contain a minute fraction above 1 per cent of the alloys affected and that the amount of computation and calculation necessary to ascertain the additional duty would be great. By raising the content to 1½ per cent, it was stated, customs officials are relieved of much labor.

Details of the Changes

A telegram from Washington, published on page 153 of THE IRON AGE of July 21, gave the important news of the passage of the metal schedule of the Fordney tariff bill by the House of Representatives and indicated in brief the changes which had been made since the bill was introduced. More explicitly these changes are stated as follows, so that those who wish to do so can compare the amended sections with the sections as found in the bill as introduced in the House and published in THE IRON AGE of July 7:

In paragraph 301, after the word spiegeleisen the words "containing more than 1 per cent of carbon" are inserted, and spiegeleisen is defined for the purpose of this act as an iron-manganese alloy containing less than 45 per cent of manganese.

In paragraph 302 ferromanganese is defined as such iron-manganese alloys as contain 45 per cent or more of manganese and the words "and spiegeleisen" are inserted after "ferromanganese" in line 16, so that ferromanganese and spiegeleisen when containing not more than 1 per cent of carbon take a duty of 2 1/5c. per pound of manganese content plus an ad valorem rate of 28 per cent. The change is not particularly significant and was made at the suggestion of the Tariff Commission. There is only one concern in the United States making spiegeleisen containing 1 per cent or less of carbon and the material, made in extremely limited quantities, and selling at 80c. per lb., is used by the chemical industry as a compound.

In paragraph 304 "tapered or beveled" bars are omitted as is also the word "mill" before shafting. The Tariff Commission suggested the first words omitted added nothing to the word "bars," and that the word "mill" before shafting limited the meaning of the word "shafting," the intention of the framers of the schedule being to include all shafting.

In paragraph 305, the required content of molybdenum in order to get the additional duty of $1.25 per lb. was changed from 1 to 1½ per cent and a similar change was made in regard to tungsten content before application can be made of the additional duty of 72c. per lb. The amended provisos read as follows: "That manganese and silicon shall not be considered as alloying material unless present in steel in excess of 1 per cent manganese or silicon; Provided further, That an additional cumulative duty of $1.25 per lb. on the molybdenum content in excess of 1½ per cent, and 72c. per lb. on tungsten content in excess of 1½ per cent shall be levied, collected and paid on any articles containing molybdenum and tungsten."

In paragraph 316 (wire), a change was made so as to include wire made of "iron, steel and other metal" instead of "iron or steel," coated by dipping, galvanizing, sherardizing, electrolytic and any other process with zinc, tin or other metal, the duty being 2/10 of 1c. per lb. in addition to the rate imposed on the wire of which it is made. The revision was explained by Representative Tilson on the ground that copper, brass and other wire was struck from paragraph 378, taking rates ranging from 1½c. to 4c. per lb.

In wire paragraph 317 words "except gold, silver, or platinum" struck out because articles of this description whose value consists chiefly of these metals are covered in paragraph 393.

In paragraph 350, relating to pins, an amendment makes the paragraph read as follows: "Pins with solid heads, without ornamentation, including hair, safety, hat, bonnet, and shawl pins; and brass, copper, iron or steel or other base metal pins with heads of glass, paste or fusible enamel; all the foregoing not plated with gold or silver, and not commonly known as jewelry, 28 per cent ad valorem."

In paragraph 354 relating to penknives, pocket knives, etc., amendment is made so that blades, handles or other parts of knives or erasers shall be dutiable at not less than the rates imposed upon knives and erasers valued at more than 50c. and not exceedingly $1.25 per dozen; that is, 5c. each and 30 per cent ad valorem.

In paragraph 377 amendment made so as to include nickel silver with German silver, unmanufactured, the rate being unchanged at 20 per cent ad valorem.

In paragraph 378 by omitting the words relating to "wire not coated or covered," copper wire and copper-clad wire coated with tin, brass wire and bronze wire, these wire products become automatically covered by the basket clause, (paragraph 393) which assesses ad valorem duties of 45 and 35 per cent, as compared with specific duties ranging from 1½c. to 12c. per lb., originally contained in paragraph 378.

In paragraph 383 relating to quicksilver duty was increased from 7c. to 35c. per lb. as a result of letter to committee on Ways and Means from Secretary of War Weeks stating that importations of mercury, essential to manufacture of munitions, had depressed domestic mining which it was urged should be encouraged as a matter of national defense.

In paragraph 390, relating to zinc-bearing ores, words "including calamine" struck out with explanation that "calamine" is a zinc-bearing ore and therefore need not be specifically mentioned; and duties on 10 per cent or more of zinc and less than 20 per cent increased from ¼c. to ½c. per lb. zinc content; on 20 per cent or more zinc and less than 25 per cent increased from ½c. to 1c. per lb. on zinc content and on 25 per cent or more increased from 1c. to 1½c. per lb. on zinc content. The entire proviso of this paragraph which contained the increased rates mentioned was struck out so that higher rates become permanent instead of obtaining for two years after the passage of the act.

Causes of Wastes in Metal Trades

Management of Operations and of Men Blamed for Largest Share—Cost Placed at Nearly One Billion Dollars

IDLE men and machinery are causing an annual loss of nearly $1,000,000,000 a year in the metal trades industry, says a report issued by the Committee on Elimination of Waste in Industry of the American Engineering Council. This estimate covers the value of labor only, and does not include the value of materials that would be utilized if the productivity of labor were increased. The value of increased possible production in the United States even in normal time would, it is estimated, be over $500,000,000.

The metal trades findings are a part of the general report made by the committee on its national assay of industrial waste, directed by L. W. Wallace as vice-chairman. The metal trades investigation was in charge of Fred J. Miller and William B. Ferguson. The report presents the views of managing executives in 32 of the plants visited. Being asked their opinion as to the main cause of waste or inefficiency, their answers were as follows:

Eight plants referred particularly to present business conditions, and cited the most important cause as the uneven volume of business, or the fluctuation in the demand for the product; lack of enough business to keep going at normal capacity. In four plants the cause given concerned the railroad situation and the functioning of the Railroad Adjustment Board. In three plants the cause given was lack of standardization of design of products. In two plants the cause given was labor turnover and strikes, one executive saying that these had been caused by war-time conditions.

In four plants the cause given was lack of planning —the exact words used being "lack of proper planning and routing"; "lack of correct planning and material control," "unscientific planning and management," and "lack of efficient planning and management methods." In six plants the cause given was lack of co-operation between management and labor. Other causes given in various plants follow:

Lack of intensive study of methods; cost control systems needed; daily cost reports needed; lack of scientific management applied to all phases of the business; inefficiency of labor; excessive overhead.

In other plants special causes in the machine tool business were given, including failure of machine tool builders to supply what the public wants. Most of the metal trades shops are very small, and require personal handling by the manager of such important problems as are handled elsewhere by systems of production control. Insufficient capital is available to develop sales and to improve facilities. Purchasing in small quantities, by the small plants places them at a disadvantage as to favorable prices and as to transportation and handling expense.

General Business Conditions Responsible for Waste

The major cause of waste or non-production in the metal trades industry at present is the unemployment of available labor and equipment, due to general business conditions which affect all other industries, the report says, adding:

The United States Bureau of Labor Statistics reports on a survey of 1423 firms in the metal trades industry, employing 1,643,253 men, that the decreases in the number on the payroll from February, 1920, to February, 1921, were 24.2 per cent in the iron and steel industry, 42.3 per cent in the automobile industry, and 16.6 per cent in the car building and repairing industry*. The Employers' Association of Detroit reported March 10, that 79 shops were employing 67,137 hands, compared to 198,705 employed April 7, 1920. In Philadelphia, out of 150,000 hands employed in the metal trades in July, 1920, about 30,000 were out of work March 1, 1921.

Present industrial conditions in the United States and abroad affect the metal trades very seriously, and the industry as a whole is operating at only about 60 per cent of normal output. Manufacturers can undoubtedly hasten a return to normal conditions by producing goods as economically as possible, so as to make selling prices low enough to attract buyers.

Management Held Responsible for Most of Waste

There are nearly 2,000,000 people engaged in the establishments of the metal trades industry, and an enormous increase in total production is possible. It is estimated that at present about 80 per cent of the responsibility for waste, or non-production, rests with management; i. e. with the managers and executives in the plants.

The estimated waste in fifteen representative plants selected by the committee averages 28 per cent for them all, and ranges from 8 per cent waste for the best plant to 56 per cent for the worst. The size of the plant, whether large, medium or small, does not necessarily affect its efficiency, as some large plants as well as some small ones have a large waste factor.

The metal trades, says the report, constitute the largest manufacturing industry in the United States, in the number of employees engaged and in the value of products. The industry is pretty much concentrated east of the Mississippi River, in the New England States, the Middle Atlantic States and in the Middle West. Pennsylvania and Ohio lead in the industry; then follow New York, Illinois, Massachusetts, Connecticut and New Jersey. The metal-making branch of the industry is not included in this survey—that is, the branch which produces what are usually known as "raw materials," plates, shapes, wire, pipe, etc.

Proper Relations Between Management and Labor Needed

A comprehensive study and survey was made of fifteen representative plants, of various sizes and types, distributed through the states which lead in the industry. In addition to these detailed surveys, a number of other plants were studied, and general information obtained through the co-operation of various metal trades associations.

The major causes of waste or non-production, applicable to normal times as well as to the present abnormal times, are attributed to instability of labor employment and to inefficient management. Most of the plants surveyed gave very little thought to the instability of labor employment.

Proper relationship between management and labor, such as exist in the most productive plants investigated, is more than ever a controlling factor. The plants with the highest labor turnover (which reflects discontent) are in general the most wasteful of human effort; hence secure the smallest production per man-hour. It is found further that, generally, the best relationship exists, and the best understanding and least friction prevail, in plants where the most thorough and scientific study of organization methods and standards have been made by the management in co-operation with the workers.

Careful planning of work, providing and moving materials by means of effective and recognized methods of material control; comparison of output of departments and of individuals with fair standards of performance, fairly and scientifically determined; these are the practices of those concerns which have been most free from labor unrest, and where greatest

*These figures were given on page 719, THE IRON AGE, March 17. Later figures of similar import have since been published, as they became available.

mutual confidence and co-operation exist between employer and employed.

Provision by the management of proper facilities and conveniences for developing the latent productivity of the workers, and provision of fair incentives for those who "make good," play a large part in eliminating waste in the best establishments. It is shown by experience of the plants visited, as well as by general experience, that considerable improvement can be brought about by means of modern employment methods, which provide, among other features, for a close study of "why men quit."

Heavy Cost of Labor Turnover Stressed

Dealing with the cost of labor turnover, the report says:

The average labor turnover for the year 1920, for the plants covered by these studies (wherever records were kept, which was the case in less than half of the plants), was 160 per cent, the percentage given in most cases being the ratio between the number of "separations" and the average number on the payroll. The highest turnover was 366 per cent.

There is a practical minimum to the labor turnover in a shop or factory, which cannot be excelled in special cases. There are separations that are unavoidable, due to deaths, marriages, etc., for which 60 per cent may be allowed, which still leaves an avoidable or preventable turnover of (say) 100 per cent annually. This of course can be eliminated only by a most thorough understanding and co-operation of all concerned: management, labor and the public.

In this industry, then, with its 2,000,000 employees, with the average plant virtually renewing its entire working force, or filling each position, every 8 months, we have 2,000,000 unnecessary separations, the equivalent of 2,000,000 workers annually leaving and rehired somewhere else, and at what cost? Expert estimates of the cost of labor turnover vary from $50 to $250 per employee hired, trained and separated. An average figure of only $50 each, applied to 2,000,000 employees turned-over, means an average waste of $100,000,000, due to avoidable labor turnover, in this one industry.

Instability of labor employment resulting from strikes and lockouts has not been as serious in the metal trades industry as in some others, with the exception of the shipbuilding branch of this industry.

Co-operation and Frank Conferences Urged

Open interchange of ideas and business results by managements, both in the particular industry and in other industries, should lead to a higher level of methods, service and general business ethics. If carried on through definite channels, such interchange might easily result in a combined study of the possibilities of the future, and the avoidance in the years to come, of such conditions as we are now facing. It is evident that management of labor must be elevated to a higher plane. Because labor is the major factor in most if not all industries, it should be led by recognized intelligence, rather than by radical agitators on the one hand or by stupid reactionaries on the other.

Remarkable and very favorable results have been secured in labor relations and in improvement of efficiency, simply by establishing frank and open conferences and free interchange of opinions, usually in genuine open shops (shops in which no prejudice or discrimination is allowed to exist either for or against men who do or do not belong to labor organizations); and sometimes by collective bargaining and dealing with a shop committee, to which is delegated all responsibility for keeping the men to agreements fairly made between management and employees.

Standardization of Design Called For

The great variety of designs called for by those who buy street cars, locomotives, trucks and other transportation equipment, is well known to be capable of beneficial limitation if all manufacturers and users could, through some agency, get together and by scientific study of the problems, not only from a utility or service standpoint, but from a manufacturing standpoint as well, reduce as much as possible the enormous number of varieties, styles, and types now required to be built. Many of these varieties are largely a matter of personal opinion or judgment of the buyers, who have not had opportunity to study the subject in all its phases. A great deal can be done toward standardizing the designs of these products, and thus promoting the best interests of all concerned.

The report cites numerous examples of waste elimination through improved management methods. Regardless of the industry or of the method by which it is conducted, human nature is always to be dealt with, if the highest success is to be attained. The report emphasizes the necessity of adequate cost control methods. Successful plants have management systems, says the report, which concludes:

"It will take time to bring the entire industry up to the higher level. During that time some establishments will probably be eliminated by the competition of the more advanced; but in this direction lies the only hope of eliminating industrial wastes."

LOWER PRICES

Reductions on Silica Brick at Chicago and on Kentucky Fire Clay Brick

PITTSBURGH, July 25.—There is no improvement in the demand for refractories and in the lack of any appreciable increase in blast furnace and steel plant activities, not much hope is entertained of early betterment. The monthly charts of the Refractories Manufacturers' Association giving production, shipments, unfilled orders and stocks on hand of fire clay and silica brick note a moderate increase in production, a decrease in shipments and a consequent gain in the stocks on hand as of June 30. Unfilled orders for fire clay brick at the end of June were practically the same as those at the end of May, or slightly in excess of 45,000,000 brick. Unfilled orders for silica brick declined rather heavily in June, the bookings as of June 30 amounting to somewhat in excess of 15,000,000 brick as compared with about 18,000,000 one month before. The figures for July are not expected to show any change in the drift.

Although business lately has been extremely quiet, it is evident that some inquiries are coming out for we note lower prices on silica brick in the Chicago district and also on Kentucky fire clay brick, and it is doubtful whether these reductions would have been made unless there were inquiries. Chicago silica brick now is quotable at $38 to $43 per 1000, f.o.b. works, a drop of $2 to $4 per 1000 from the former quotations. The decline in Kentucky fire clay brick is a matter of about $3 per 1000. Other quotations are unchanged but are purely nominal and probably would be shaded on the appearance of attractive orders. Plant operations, taking the country as a whole, are about 15 per cent of capacity.

We quote per 1000 f.o.b. works:

	High Duty	Moderate Duty
Fire Clay:		
Pennsylvania	$36.00 to $43.00	$30.00 to $36.00
Ohio	36.00 to 40.00	30.00 to 35.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	40.00 to 45.00	30.00 to 40.00
Missouri	45.00 to 50.00	35.00 to 40.00
Silica Brick:		
Pennsylvania		35.00 to 40.00
Chicago		38.00 to 43.00
Birmingham		46.00 to 50.00
Magnesite Brick:		
Standard size, per net ton		70.00 to 75.00
Chrome Brick:		
Standard size, per net ton		60.00 to 65.00

The W. R. Miller Co., designers and builders of metallurgical furnaces, Pittsburgh, has moved from the House Building to Boggs and Jasper streets, where it has erected its own office building. The company recently received patents on a new mechanical gas producer.

Iron and Steel Markets

PRICES GO LOWER

Sharp Declines in the Central West

Further Domestic and Export Inquiries from Railroads

Further settling of steel prices has come in the past week and in some products the downward movement has been rapid. Informal announcement of a 1.75c. price for steel bars and of 1.85c. for plates and structural shapes—a $3 per ton cut below the July 5 schedule—was made in the week by several independent producers, but already somewhat lower prices are reported, indicating more aggressive competition in practically all markets.

Some encouragement is found in the larger tonnage under inquiry, but it is well recognized that in such a market no approach to price stabilization is to be expected. Every producer is meeting competition as it develops.

That the Steel Corporation's earnings for the second quarter were better than most predictions is ascribed in part to its unique advantage in railroad ownership and the fact that for nearly all the second quarter Chicago business was done on the Pittsburgh base. Lake navigation and cement earnings were also a factor.

The Central West has developed the most marked price concessions of the week. In semi-finished steel the new level is about $3 per ton below what has been considered the market. Sheet bars have sold at $32, Pittsburgh, as against $35. A Cleveland inquiry for 2500 tons of slabs has brought out some low quotations. On rerolling billets $30, Pittsburgh, is now the market and $35 for forging billets, both down $3.

In sheets several late Ohio transactions indicate a third reduction of $5 per ton within five weeks, and at that the market is irregular. The basis on the larger sales is 3c. for No. 28 black, 2.25c. for No. 10 blue annealed, and 4c. for No. 28 galvanized. The Ford Motor Co. has been a buyer of high-grade blue annealed sheets for crank cases.

A Mt. Vernon, Ohio, inquiry for 6900 tons of bars, plates and shapes has brought out new low prices, about two-thirds of this tonnage being for the stadium at Columbus on which the accepted bid was $69.50 for the steel erected. On 1000 tons of hard bars for reinforcement work on the stadium the low price was 1.62c., Pittsburgh.

Prices on hoops, bands, hot rolled strip steel and light rails have weakened in line with heavier products.

Operations by Steel Corporation mills are running close to 30 per cent this week, an improvement over the previous July average.

There is new pressure from blast furnace and steel companies for lower freight rates. An early meeting between these interests and traffic officials of lines serving Pittsburgh and Valley districts will be held at Pittsburgh.

The expected opening of bids next week on the Bombay, India, pipe line, requiring more than 70,000 tons of plates is of moment to large steel and contracting interests in this country and Great Britain. The advantage in price rests with this country and this may yet outweigh British Government influence.

More optimistic sentiment in some parts of the country in respect to pig iron is due to insistence of buyers upon prompt delivery rather than to increased demand. At several important centers the downward trend of prices seems to be arrested, at least temporarily.

Railroad car repair work is gradually being arranged for. The New York Central has distributed orders among eight builders for 4000 cars and may double the amount. One late contract is for 500 car repairs for the Buffalo, Rochester & Pittsburgh. The tank work for the 500 tank cars reported taken from the Russian Soviet Government by the Canadian Car & Foundry Co. would probably be undertaken in the United States.

Railroad material inquiries continue to feature the international markets. In August 12,000 tons of rails are to be bid on for Chile and 3000 tons for Morocco. Some 12,000 tons will be bought for a new Bolivian railroad and 1000 tons of light rails are wanted in Manila. Germany is figuring on 8000 tons of heavy rails for Finland, and Switzerland is sounding the market.

A second reduction in wages at the Steel Corporation's Lake Superior iron mines is announced, effective Aug. 1. It amounts to 10 per cent, whereas the May 16 reduction was 20 per cent. The corporation will also curtail further its mining operations. At all Lake Superior mines the outlook for winter work has grown more unfavorable as pig iron production has declined.

Pittsburgh

PITTSBURGH, July 26.

Sentiment in iron and steel trades here is still inclined toward hopefulness, notwithstanding that the past week has seen further slashing of prices in practically all steel products. Independent steel companies quite generally have revised "official" quotations downward, and now are on a basis of from $3 to $5 per ton below the prices established in the first week of July. So far there has been no public announcement of a change by the Steel Corporation, but it is generally understood that this company is meeting the reduction of the independents. Price concessions have been more severe in sheets than in any other finished product, at least two mills having gone to 3c. on black sheets for production tonnage against an inquiry recently put out by a Pittsburgh fabricating interest. This compares with 3.50c., the nominal quotation of the American Sheet & Tin Plate Co., and 3.25c., the quotation regarded as "official" by a number of independent makers. A quotation of 3.75c. is reported to have been made to a Pittsburgh district consumer on galvanized sheets and this also is said to have been for production sheets as distinct from those out of stock. Little real stability is observed in the prices of any of the steel products, but apparently more business is developing as a result of the fact that buyers can come pretty near naming their own prices, and this seems to be the basis for feeling that the industry is rounding the corner from the recent intense dullness.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 26, 1921	July 19, 1921	June 28, 1921	July 27, 1920
No. 2X, Philadelphia‡	*$21.35*	$21.85	$25.50	$49.15
No. 2, Valley furnace†	19.50	19.50	21.00	45.00
No. 2 Southern, Cin'ti†	24.50	24.50	26.00	45.60
No. 2, Birmingham, Ala.†	20.00	20.00	21.50	42.00
No. 2, foundry, Chicago*	18.50	18.50	20.00	46.00
Basic, del'd, eastern Pa.	21.25	21.25	23.50	44.40
Basic, Valley furnace	19.00	19.00	20.50	46.00
Bessemer, Pittsburgh	22.46	22.46	24.46	47.40
Malleable, Chicago*	18.50	18.50	20.00	46.50
Malleable, Valley	20.50	20.50	22.50	45.00
Gray forge, Pittsburgh	21.46	21.46	21.96	44.40
L. S. charcoal, Chicago	36.00	36.00	37.50	57.50
Ferromanganese, del'd	70.00	70.00	70.00	225.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	*30.00*	33.00	37.00	65.00
O.-h. billets, Pittsburgh	*30.00*	33.00	37.00	65.00
O.-h. sheet bars, P'gh.	*32.00*	35.00	39.00	70.00
Forging billets, base, P'gh.	*35.00*	38.00	42.00	85.00
O.-h. billets, Phila.	*35.74*	38.74	42.74	69.10
Wire rods, Pittsburgh	42.00	42.00	48.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh.	*1.90*	2.00	2.20	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.10	2.10	2.25	4.75
Iron bars, Chicago	*1.85*	1.90	2.15	3.75
Steel bars, Pittsburgh	*1.75*	1.80	2.00	3.50
Steel bars, New York	*2.13*	2.18	2.38	4.02
Tank plates, Pittsburgh	1.80	1.80	1.90	3.25
Tank plates, New York	2.18	2.18	2.28	3.77
Beams, etc., Pittsburgh	1.85	1.85	2.00	3.10
Beams, etc., New York	2.23	2.23	2.38	3.27
Steel hoops, Pittsburgh	2.50	2.50	2.50	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	July 26, 1921 Cents	July 19, 1921 Cents	June 28, 1921 Cents	July 27, 1920 Cents
Sheets, black, No. 28, P'gh.	*3.00*	3.25	3.75	7.50
Sheets, galv., No. 28, P'gh.	*4.00*	4.25	4.75	9.00
Sheets, blue an'l'd, 9 & 10.	*2.40*	2.50	2.85	6.00
Wire nails, Pittsburgh	2.75	2.75	3.00	4.00
Plain wire, P'gh.	2.50	2.50	2.75	3.50
Barbed wire, galv., P'gh.	3.40	3.40	3.65	4.45
Tin plate, 100-lb. box, P'gh.	*$5.50*	$5.75	$6.25	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$12.50	$12.50	$13.25	$35.50
Carwheels, Philadelphia	16.00	16.00	18.00	40.00
Heavy steel scrap, P'gh.	12.00	12.00	12.00	27.00
Heavy steel scrap, Phila.	11.00	11.00	11.00	23.00
Heavy steel scrap, Ch'go.	10.00	10.00	10.25	24.50
No. 1 cast, Pittsburgh	16.00	16.00	16.00	41.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	38.00
No. 1 cast, Ch'go (net ton)	*11.50*	12.50	12.50	36.00
No. 1 RR. wrot, Phila.	13.50	13.50	13.50	33.00
No. 1 RR. wrot, Ch'go (net)	9.00	9.00	9.50	24.50
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$3.00	$18.00
Foundry coke, prompt	4.00	4.00	4.25	19.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*12.50*	12.75	12.62½	19.00
Electrolytic copper, N. Y.	*12.25*	12.62½	12.62½	19.00
Zinc, St. Louis	4.25	4.25	4.25	7.85
Zinc, New York	4.75	4.75	4.75	8.20
Lead, St. Louis	4.35	4.35	4.15	8.75
Lead, New York	4.40	4.40	4.40	9.00
Tin, New York	*26.00*	27.00	29.00	48.50
Antimony (Asiatic), N. Y.	4.65	4.65	4.87½	7.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, July 26, 1921, Finished Steel, 2.364c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

July 19, 1921,	2.407c.
June 28, 1921,	2.607c.
July 27, 1920,	3.974c.
10-year pre-war average,	1.684c.

Some slight increase in plant activities is observed here and there. The Carnegie Steel Co. this week started up its Clairton, Pa., plant which had been idle for several weeks and the American Steel & Wire Co. has turned on the blast at one of its furnaces at Donora, Pa. The American Sheet & Tin Plate Co. this week started up its Guernsey works at Cambridge, Ohio, increased the number of active hot mills at Shenango works at New Castle, Pa., and is planning to start up its National works at Monessen, Pa., at an early date. While these increases are due to the fact that stocks have dwindled to a point where they need replenishing, they are important as showing that stocks in second hands are growing smaller and needs are increasing. It is probable that steel plant operations will continue irregular for a time because at the moment there is nothing to give buyers real confidence in prices and consequently they are likely to continue to take on supplies as they are needed. Such buying makes difficult the building up of rolling mill schedules. Outside of the Steel Corporation plants, where the rate remains 37c. an hour for common labor, the going rate in this and nearby districts is 30c. an hour. Structural interests view with some satisfaction the recent action of a bricklayers' union here in adopting a wage schedule cutting the rate from $12 to $10.40 per day. There is no scarcity of labor here at present; in fact, the contrary is the case and thousands of men are seeking work at practically any rate the employers will pay. It is noted that railroad labor now is the best paid of any class. Deflation of labor has been pretty drastic and in the iron and steel industry there is a fairly general belief that only the deflation of freight rates remains to complete the cycle.

The downward drift of pig iron prices seems to have been halted temporarily at least and some seem to believe that the market is dragging on bottom, and even with a drop in ore prices and in freight charges current prices are low enough. The coke market has been featured by the sale of 30,000 tons of furnace grade for a Buffalo consumer for August and September shipment at a price of $2.75 per net ton, Connellsville oven.

Ferroalloys.—Business shows no improvement and prices are quite as nominal and indefinite as they have been for several weeks. Ferromanganese is held by domestic producers at $75, delivered, for 80 per cent material and $72.50 for 76 to 78 alloy, but against one or two small inquiries selling agents were instructed not to let the business get away, if a cut of $3 or $4 a ton would get the order. There are no definite offers of English material much under $70, Atlantic seaboard, but the reports will not down that $65 and even $60 would be accepted on contracts. Spiegeleisen still is inactive and prices are holding only because production is nil and available stocks small. Inquiries are out for a few carloads of 50 per cent ferrosilicon against which $65, furnace, freight allowed, has been quoted by a couple of makers. Indications are that this business will be closed at less than that figure.

We quote 76 to 80 per cent ferromanganese at $70 delivered on domestic; English, 76 to 80 per cent, $67.50 to $70, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $27 to $28 furnace quoted by makers on direct business and $25 to $26 furnace on resale tonnages; 50 per cent ferrosilicon, $65 furnace, freight allowed, for domestic and foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $41.50; 10 per cent, $45; 11 per cent, $48.50; 12 per cent, $51.60. Silvery iron, 6 per cent, $32; 7 per cent, $33.50; 8 per cent, $35.50; 9 per cent, $37.50; 10 per cent, $40; 11 per cent, $43.30; 12 per cent, $46.60. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Pig Iron.—The market again has lapsed back into dullness, sales having run entirely to lots of one to

two carloads, but there seems to be a more optimistic undercurrent in the trade, due possibly to the fact that the consumers of foundry iron have been pretty insistent on early delivery of their purchases. We make no change in our quotation on Valley iron this week. Possibly some further liquidation of furnace yard stock will bring even lower prices than now prevail, but it is noted that if buying has not increased lately, at least consumers are showing more interest in the market and have been asking whether purchases of supplies for the remainder of the year would not be safe at current levels. Selling prices are so far out of line with actual costs that it may be said safely that none of the idle merchant furnaces is likely to be blown in until there is either an appreciation in the price or a decline in costs. Lower prices for ore are being urged, but blast furnace interests generally regard freight charges as the obstacle to a reduction in producing charges. We note one sale of 150 tons of No. 2 foundry iron from a western Pennsylvania furnace at $19.50. The most recent business in basic iron was at a delivered price equivalent to about $17.75 at Valley furnaces, but the iron moved from a furnace having a low freight rate to the consuming point.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00
Bessemer	20.50
Gray forge	18.50
No. 2 foundry	19.50
No. 3 foundry	19.00
Malleable	20.50

Billets, Sheet Bars and Slabs.—There has been some matching by independents of "official" quotations with those which have been privately quoted against such recent inquiries as have been up. The Steel Corporation as yet has made no change in its schedules, but is reported to be meeting lower quotations when provided with the right sort of evidence. The new prices average about $3 per ton below those named as of July 5. Sheet bars, which it is reported recently sold down to $32, now are being quoted at that price, and slabs are available at $31. A recent inquiry for a sizable tonnage of slabs brought a quotation of $31, but the business was not obtained, the report being that the price was $2 or $3 a ton above what the material could be had for.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $30; 2 x 2-in. billets, $32; Bessemer and open-hearth sheet bars, $32; slabs, $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—All makers still are quoting $42 for the base size of soft rods, but this price is finding almost no basis in sales. There is almost no stability to prices of rivets and bolts, and suggestions are common that on wire products the prices established the first week of July are being shaded. Inquiries for rods are altogether insufficient to provide a test of the price. Prices are given on page 233.

Plates.—The independent mill price has quite definitely settled to 1.85c. Pittsburgh, but this figure is looked upon as referring merely to small tonnages and would be shaded on sizable lots. Indeed, 1.75c., Pittsburgh, recently was quoted against an inquiry for 1200 tons of tank plates. Railroad equipment companies in this district are getting very little business, even in repair work, but hopes are strong that the Government financing of the railroads will be productive of purchases. Most of the companies are carrying fairly large stocks of steel and railroad buying might not instantly bring plate orders.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.80c. to 1.85c. f.o.b. Pittsburgh.

Structural Material.—Fabricating interests in this district have not been successful bidders against any of the important structural projects recently placed. The largest of these was the new stadium for the Ohio State University which involves about 4100 tons of steel and went to the Mt. Vernon Bridge & Iron Co., Mt. Vernon, Ohio. This job is said to have been let at $70 per ton, fabricated and delivered. Plain material prices are weaker in that independents now are publicly quoting a base of 1.85c. for plates and structural shapes. This base is observed fairly well against small lot inquiries, but on sizable tonnages some mills have given protection at a lower figure. Plain material prices are given on page 233.

Iron and Steel Bars.—Independent makers of soft steel bars generally are quoting 1.75c., and this price, it is understood, is being met by the Steel Corporation. No very large inquiries are out, but orders for small lots for prompt shipment are fairly numerous. The Navy Department inquiry, for which bids were to be opened Aug. 5, and which included a large tonnage of bars, has been withdrawn. [The policy of the Government is explained in our Washington correspondence.—Editor.] Reinforcing bars rolled from billets also are quoted at 1.75c., base, with only a moderate inquiry. These bars, rolled from old rails, are quoted at 1.75c., but this price hardly can be obtained in competition with new steel bars. Iron bars are inactive and nominal at 2.50c. for refined iron. Representatives of the Amalgamated Association of Iron, Steel and Tin Workers and the Western Bar Iron Association are in conference in Chicago in an effort to agree upon a wage scale for the year ending June 30 next. The Atlantic City conference early in June adjourned without results. Union mills are in operation because the Amalgamated contract allows an additional month beyond the scale year for the reaching of an agreement.

We quote steel bars rolled from billets at 1.75c.; reinforcing bars, rolled from billets, 1.75c. base; reinforcing bars rolled from old rails, 1.75c.; refined iron bars, 2.50c., in carloads f.o.b. mill, Pittsburgh.

Steel Rails.—Light rails rolled from new steel are no longer quotable at above 1.90c. for 25-lb. to 45-lb. sections. Tonnages are freely offered at that price and a quotation of even 1.85c. has been made against some recent inquiries. These prices would indicate about 1.75c. for light rails rolled from old sections, as there usually is a spread of $2 to $3 per ton between the two kinds. Demands are few and small.

We quote 25 to 45-lb. sections, rolled from new steel, 1.85c. to 1.90c.; rolled from old rails, 1.75c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Nuts, Bolts and Rivets.—Quoted discounts and prices mean absolutely nothing as far as sales are concerned. Desire to sell is much more urgent than the desire to buy, and prices all along the line are being shaded. Manufacturers outside the Pittsburgh district are leading the way in price cutting and makers here, rather than lose a regular customer, are meeting the lower prices. Price cutting in nuts is especially severe and also is sharp in bolts. It is frankly admitted that quotations are above what can be done, but the disposition of Pittsburgh makers is to wait on more settled conditions before naming new quotations. Prices and discounts are given on page 233.

Spikes.—Shading of the prices established early this month has begun to crop out, and the stabilized price of $3 per 100 lb. has become merely an asking quotation. A price as low as $2.75 is reported. Demand is purely hand to mouth. The Pittsburgh Railways Co., which is in the market for 69,000 tie plates, is reported to have been quoted less than 2.50c., the nominal quotation of makers. Prices are given on page 233.

Cold-Finished Steel Bars.—Settling of the price of hot-rolled bars to 1.75c. is reflected in a price of cold-finished steel bars, which now are obtainable in carloads at 2.50c. base. Makers feel that a conversion charge of $15 per ton is as little as they can get by on, in view of the character of the current demand which seldom calls for more than a carload and usually involves a number of sizes.

Hoops and Bands.—Demand shows no appreciable increase and the going price is very indefinite. Nominally makers are quoting 2.50c. to 2.60c. base, but 2.50c. is maximum on sales and buyers with orders to place would not have to try hard to get a lower quotation.

Hot-Rolled and Cold-Rolled Strips.—Public quotations are unchanged at 2.50c. to 2.60c. for hot-rolled and 4.25c. for cold-rolled strips. However, some business in hot-rolled recently has been placed as low as 2.40c. and cold-rolled strips have been placed at 4c. flat. Demand shows some increase from both automobile manufacturers and the makers of builders' hardware, but there is still considerable eagerness on the

part of some makers to get orders and this explains the shading of prices.

Iron and Steel Pipe.—Reports from jobbers indicate a good movement of merchant pipe, sales for June having shown a substantial increase over those for May, while the May sales were larger than those for April. This development is finding some reflection in orders upon the mills, but the jobbers are careful not to over-order and are merely specifying for supplies to round out the depleted sizes. Oil country pipe still is in light demand because of the curtailment of drilling. Some inquiries still are coming out for line pipe and we note one sale of 10 miles of 18-in. pipe to the Ohio Fuel Supply Co. Discounts are given on page 233.

Steel Skelp.—The stabilized price of 2c. is finding no basis whatever in sales and it is believed that an inquiry, even of moderate proportions, would bring the price of 1.90c. and possibly less.

Wire Products.—Business still is of extremely limited proportions because buyers are not convinced that prices have struck bottom and consequently are merely taking on only such supplies as are urgently needed. Buyers generally are stipulating that they must be guaranteed against a decline in prices on such business as they are placing. Some manufacturers are meeting such requests while others are refusing them. Rumors have been common lately of quotations of $2.50 on nails, but makers deny having made such a concession, although there seems to be some equalizing of freights on competitive business. Ironton, Ohio, makers are reported to be quoting nails at 2.75c. f.o.b. Ironton, which in some of the territories served by these mills would figure back close to $2.50, Pittsburgh.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Sheets.—Business in general is somewhat better than it has been, evidence of which is found in a further slight gain in mill operations. The American Sheet & Tin Plate Co. last week operated 40 per cent of its sheet mills and had the best run of orders and specifications of any week this year. Independent plant operations have increased somewhat since the agreement was reached with the Amalgamated Association of Iron, Steel and Tin Workers on a wage scale for the year to end June 30, 1922. The drive for business, however, still is pretty strong, and some very low prices are being named to attract orders. The American Sheet & Tin Plate Co. nominally is quoting the July 7 bases of 3.50c. for black, 4.50c. for galvanized and 2.65c. for blue annealed, in the base gages. The company, however, is meeting competition when provided with the right sort of evidence by its regular customers. Independent mills are quoting as low as 3c. on black sheets, 4c. on galvanized sheets, and 2.40c. on blue annealed. These quotations are said to be against material in stock and not for new rollings, but a quotation of 3.75c. recently was made on galvanized sheets and the mill naming it gave as a reason that it was desirous of starting up some idle capacity. The situation in sheets is extremely indefinite as to prices. Each maker seems to have his own ideas as to prices and the terms are largely a matter of negotiation. A Pittsburgh fabricating interest which has an inquiry out for 750 tons of sheets for roofing and sidings in connection with an Eastern structural project has been quoted 3c. for production sheets by two makers and 3.10c. by another. Prices are given on page 233.

Tin Plate.—There is still a fair amount of business in tin plate for condensed milk cans and for tobacco boxes, but in other kinds of material demand still is extremely slack and hopes are low of any decided betterment over the remainder of the year. The more common quotation on production plate still is $5.75 per base box Pittsburgh, but some makers operating their plants on an open shop basis recently revised wage scales of tonnage men to a point where they can take on business at $5.50 and even less, and escape serious loss. The market is quotable at $5.50 to $5.75 per base box, Pittsburgh, but it is not firm at these prices.

Coke and Coal.—The Wickwire-Spencer Steel Corporation, late last week, closed against its inquiry for 500 tons a day of furnace coke for August and September shipment, at a price of $2.75 per net ton oven. Otherwise the market has developed no new features. Spot tonnages of furnace coke continue to be available at $2.75, oven, although the larger operators are holding to $3 and are disinclined to sell for less. The claim is set up that a price of less than $3 should not be regarded on the ground that the coke is not going to blast furnaces. But the fact that coke is not finding the ordinary use is ascribed to the small number of active blast furnaces. Foundry activities are increasing and this finds reflection in the demand for standard 72-hr. coke. Prices are unchanged, ranging from $4 to $4.50 per net ton, oven, but there is more firmness within that range than there was recently. Reduction in the freight rates on coal that will make possible the shipment of Pennsylvania coal into such markets as Chicago, on practically even footing with Illinois and Indiana coal, has not yet found reflection in sales. Prices remain rather weak in this market. Mine run steam coal ranges from $1.50 to $2 per net ton, mines, and the same range will cover a recent business in by-product grade. These prices refer to coal from non-union fields. Gas coal is almost exclusively the product of union fields and while the demand often before has been better, operators seem disinclined to consider less than $2.25.

Cut Nails.—Both the Reading Iron Co. and the Wheeling Steel Products Co. now are quoting a base of $3 per keg, f.o.b. mill, for carload lots, and 3.10c. for less than carloads. Demand is very light in this district.

Old Material.—No material change can be made in quotations which, as for some time, represent largely what dealers would pay for material to throw down on their yards, but if there is any definite tendency, it is in the direction of firmness, due to an increasing tendency among railroads and other producers to hold rather than sell their material at current quotations. The Pennsylvania Railroad, Eastern Region, withdrew 11,000 tons of old rails offered in the July list because the bids were regarded as too low. These rails and some other material will be offered in the August list. Current prices on turnings also are so low that the automobile companies and other producers are letting their stocks accumulate. Some users of turnings who have been seeking tonnages find that bids of $7 and even $7.25 have not brought out many. Bids of $14 for heavy breakable cast have been equally without responses. Steel companies which would lay down some heavy melting steel at $12 to $12.50, have not been offered much material at those prices. Dealers have cut the prices they are willing to pay for some grades, but this may be ascribed to the fact that present signs do not indicate an early revival of demand and they are keeping in mind the carrying charges when figuring the prices they will pay. Indicative of the difference between prices the dealers and mills are paying, it is noted that a Pittsburgh independent recently bought some scrap rails at $13.50 per gross ton from the Pennsylvania Railroad and for some knuckles and couplers about $1 a ton more.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$12.00 to $12.50
No. 1 cast cupola size	15.50 to 16.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	13.50 to 14.00
Compressed sheet steel	9.00 to 9.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	8.00 to 8.25
Railroad knuckles and couplers	12.50 to 13.00
Railroad coil and leaf springs	12.50 to 13.00
Railroad grate bars	10.00 to 10.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	15.50 to 16.00
Railroad malleable	11.50 to 12.00
Iron car axles	18.00 to 19.00
Locomotive axles, steel	17.50 to 18.00
Steel car axles	13.50 to 14.00
Cast iron wheels	13.00 to 13.50
Rolled steel wheels	12.50 to 13.00
Machine shop turnings	7.00 to 7.50
Sheet bar crop ends at origin	11.50 to 12.00
Heavy steel axle turnings	8.50 to 9.00
Short shoveling turnings	8.00 to 8.50
Heavy breakable cast	13.50 to 14.00
Stove plate	11.50 to 12.00
Cast iron borings	7.50 to 8.00
No. 1 railroad wrought	12.00 to 12.50

Chicago

CHICAGO, July 26.

With the announcement of a further price reduction of $3 per ton on plates, shapes and bars, the independent steel companies have again taken official cognizance of the price cutting which has been going on for some weeks. The Steel Corporation, following its policy of meeting competition, is also quoting the new prices, which are 1.85c. for plates and shapes and 1.75c. for bars. These are to-day's ruling prices for small-lot business, but in case of plates and shapes particularly, tonnages had been sold prior to the announcement at prices lower than those which the independent companies now name as their official quotations.

The effect of the reduction mainly is to give both buyers and sellers a new basis from which to work. In other than these three major products, there is also marked price weakness, particularly in sheets. Open bids taken by the Big Four Railroad on 450,000 tie plates brought out a price as low as $40 per net ton, Pittsburgh.

Mill operations in this district continue virtually unchanged, the leading interest maintaining a 30 per cent rate and the leading independent a 25 per cent rate. A slight improvement in operation of sheet mills and wire mills is noted. Wire trade during the past week has shown a marked betterment, jobbers buying in fair quantities for quick replenishment of stocks.

Pig Iron.—The principal purchases of pig iron during the past week were made by a cast-iron pipe company for its Ohio plant. A few thousand tons of No. 2 foundry were divided among two or three sellers, some of the business going at $18, Northern furnace. Although some sellers report a slight improvement in demand for iron, business is confined almost entirely to carload lots, on which the ruling quotations are $18.50 for No. 2 and $19 for No. 1. An inquiry from the St. Paul Railroad for 2500 tons of malleable is still pending.

Quotations on Northern foundry, high phosphorus, malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.00 to $36.50
Northern coke, No. 1, sil. 2.25 to 2.75	19.00 to 19.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	18.50 to 19.00
Northern high phos	18.50 to 19.00
Southern foundry, sil. 1.75 to 2.25	26.67
Malleable, not over 2.25 sil	18.50 to 19.00
Basic	18.50 to 19.00
Low phos., Valley furnace, sil. 1 to 2 per cent, copper free	35.00
Silvery, sil. 8 per cent	37.53

Ferroalloys.—A car wheel company is in the market for 300 tons of ferromanganese. The quotation on carload lots has been around $78, delivered, but it is believed that a tonnage the size of the one inquired for can be bought for $75. Fifty per cent ferrosilicon has been sold at $71, delivered, for a single carload.

We quote 78 to 82 per cent ferromanganese, $78 delivered; 50 per cent ferrosilicon, $71 delivered; spiegeleisen, 18 to 22 per cent, $36 delivered.

Plates.—A $3 per ton reduction by the leading independent mills which has been met by the Steel Corporation, now fixes the "official" price at 1.85c., Pittsburgh, but lower prices have been quoted, it being possible to buy at 1.75c., Pittsburgh, even in relatively small lots. The rapidity with which steel prices have softened in the past few weeks has left buyers in an uncertain state of mind with regard to the future course of the market, with the result that this week there is comparatively little business of importance upon which to quote.

The mill quotation is 1.75c. to 1.85c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.03c. for plates out of stock.

Structural Material.—The new price of 1.85c., Pittsburgh, on plain material is merely an official recognition by the mills of the prices which have been quoted on some structural jobs during the past two or three weeks. One recent order placed by a fabricator, amounting to 1200 tons, is said to have been taken at 1.80c., Chicago, equivalent to 1.42c., Pittsburgh. In that instance the fabricator's price for the material fabricated and delivered was extremely low—$61 per ton. A number of projects which have lately come into the market are still pending. Among the lettings of the past week are the following:

Palace Theater Building, South Bend, Ind., 300 tons, Rochester Bridge Co.

Extension to township high school, Joliet, Ill., 774 tons, to Hansell-Elcock Co.

State of Montana, three steel truss spans across Clark's Fork, Noxon, Mont., 366 tons, to unnamed fabricator.

Commercial National Bank Building, Madison, Wis., 138 tons, to unnamed fabricator.

Midwest Refining Co., two oil storage tanks and one additional steel roof, 544 tons, to Chicago Bridge & Iron Co.

Bids have been taken by the United States Smelting & Refining Co. on 180 tons for a steel plate flume at Salt Lake City, Utah.

The mill quotation is 1.80c. to 1.85c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.03c. for materials out of warehouse.

Bolts, Nuts and Rivets.—There has been continual shading of prices on bolts, nuts and rivets. New discounts are brought out with almost every inquiry. Some mills decline to go to the extreme limits which their competitors are quoting to get business. The market is quite irregular and prices are not well defined. Jobbers' prices unchanged.

Jobbers quote structural rivets, 4.03c.; boiler rivets, 4.13c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—The new price on bars with the $3 per ton reduction announced by independent mills and met by the Steel Corporation is 1.75c., Pittsburgh, but even this price, now but a few days old, has been shaded. Bar iron is also lower, it being quite easy to do 1.85c., Chicago mill, with every indication that a fair-sized order would bring out an even lower quotation. No new concrete reinforcing work is reported and some of that which was reported last week is still pending. Rail carbon steel bars are quoted freely at 1.90c., Chicago, it no longer being possible for the mills to get above that figure. Jobbers' prices on bars are unchanged, except that an effort is being made to obtain an $8 spread over the mill price on hard and deformed steel bars for reinforcing purposes. That is, jobbers are quoting 2.53c., Chicago, but it is still possible to buy at 2.38c., Chicago.

Mill prices are: Mild steel bars, 1.75c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.85c., Chicago; rail carbon, 1.90c., mill or Chicago.

Jobbers quote 2.93c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.35c. for rounds and 50c. extra for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base.

Sheets.—The sheet market is very weak, and while the usual prices are 2.45c. for No. 10 blue annealed, 3.25c. for No. 28 black and 4.25c. for No. 28 galvanized, Pittsburgh, sales have been made at lower figures. The bottom quotations at which sales have been made appear to be 2.25c. for blue annealed, 3c. for black and 4c. for galvanized. Demand is light, but the low prices have brought out some business.

Mill quotations are 3.25c. for No. 28 black, 2.45c. for No. 10 blue annealed and 4.25c. for No. 28 galvanized, all being Pittsburgh prices subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.68c.; No. 28 black, 4.90c.; No. 28 galvanized, 5.90c.

Rails and Track Supplies.—Following the reduction a week or so ago to 2.30c., Chicago mill, on tie plates, bids were opened on 450,000 tie plates, about 2250 tons, for the Big Four Railroad. These were open quotations, the lowest being $40, Pittsburgh, by the Dilworth-Porter Co., the others being uniformly $46 per net ton, Chicago. The Chicago, Burlington & Quincy Railroad will shortly issue an inquiry for tie plates. Fair orders for railroad spikes are being received by Western mills.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.90c. f.o.b. makers' mills.

Standard railroad spikes, 3c., Pittsburgh; track bolts with square nuts, 4c., Pittsburgh; steel tie plates, 2.30c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.30c., f.o.b. makers' mills.

Warehouse Prices.—No further price changes have been made in the past week by local warehouses.

Cast Iron Pipe.—Detroit has advertised for 1500 tons of 8-in. Class B pipe, bids closing July 29. Hammond, Ind., has set Aug. 8 as the closing date for bids on 4000 tons of 36-in. pipe. Litchfield, Ill., is getting preliminary figures on about 800 tons, but formal bids will not be asked for until estimates have been compiled. Bay City, Mich., will receive bids up to Aug. 8 on 5000 tons of 20, 24 and 36-in. water pipe. On the Bay City job bids are also asked for on steel and wood pipe.

We quote per net ton, f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $51.10; 6-in. and above, $48.10; class A and gas pipe, $3 extra.

Wire Products.—A gradually improving demand for wire products, especially wire nails, has been in evidence during the past three weeks. Orders in the past week were surprisingly good, ranging from carload lots to 100 tons, but there was a considerable number of them, indicating that jobbers' stocks have run pretty low. Nearly all of the orders were for rush shipment. The better business has already been reflected in a slight improvement in mill operation especially by the leading maker. Prices are holding fairly well, there being less talk of price cutting on wire and nails than on any other steel products.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Railroad Equipment.—The New York Central has placed orders with several car builders for the repair of 4000 freight cars. The Chicago & Northwestern Railroad may be in the market soon for car repairs.

Old Material.—The most important business of the past week was the purchase by two mills of about 2000 tons each of heavy melting steel. In one instance $10, delivered, was paid and in the other $10.50 to $10.75, delivered. A mill also bought machine shop turnings at $3.50, delivered. New railroad offerings include 5000 tons by the Chicago, Burlington & Quincy and 2500 tons by the Pennsylvania Northwestern Region, while blank lists have been issued by the New York Central and Big Four.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.00 to $15.50
Relaying rails	27.50 to 30.00
Car wheels	12.50 to 13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.50 to 12.00
Heavy melting steel	10.00 to 10.50
Frogs, switches and guards, cut apart	10.00 to 10.50
Shoveling steel	9.50 to 10.00
Low phos. heavy melting steel	13.00 to 13.50
Drop forge flashings	6.00 to 6.50
Hydraulic compressed sheet	6.50 to 7.00
Axle turnings	7.00 to 7.50
Per Net Ton	
Iron angles and splice bars	13.25 to 13.75
Steel angle bars	9.50 to 10.00
Iron arch bars and transoms	13.50 to 14.00
Iron car axles	17.50 to 18.00
Steel car axles	12.00 to 12.50
No. 1 busheling	8.25 to 8.75
No. 2 busheling	5.75 to 6.25
Cut forge	8.50 to 9.00
Pipes and flues	5.50 to 6.00
No. 1 railroad wrought	9.25 to 9.75
No. 2 railroad wrought	9.00 to 9.25
Steel knuckles and couplers	10.25 to 10.75
Coil springs	11.50 to 12.00
No. 1 machinery cast	11.50 to 12.00
Low phos. punchings	10.50 to 11.00
Locomotive tires, smooth	9.75 to 10.25
Machine shop turnings	3.00 to 3.50
Cast borings	4.50 to 5.00
Stove plate	11.00 to 11.50
Grate bars	9.50 to 10.00
Brake shoes	9.50 to 10.00
Railroad malleable	11.00 to 11.50
Agricultural malleable	11.00 to 11.50
Country mixed	7.00 to 7.50

The paper on the use of powdered fuel under steam boilers presented by H. D. Savage, of the Combustion Engineering Corporation, 43 Broad Street, New York, before the American Iron and Steel Institute, at its May meeting, has been printed in pamphlet form for general distribution by the company. The paper is offered as a complete summary of powdered coal progress up to date.

New York

NEW YORK, July 26.

Pig Iron.—The effect of the prolonged period of reduced production and decreasing stocks in the hands of furnaces and melters is being shown in the increasing difficulties of foundrymen in obtaining deliveries promptly on the iron which they need. As many of them have followed a policy of buying from hand to mouth, they need immediate delivery when they place orders, and not infrequently discover that their favorite iron or iron of the analysis desired cannot be promptly obtained. This is an indication that before long there must be a buying movement, although heavy buying is not expected. Inquiries this week are more numerous than the preceding week and amount to from 1500 to 2000 tons for prompt shipment. Difficulty is also being experienced in obtaining prompt delivery of coke.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.02 to $25.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.02 to 24.52
East Pa. No. 2 fdy., sil. 1.75 to 2.25	22.52 to 23.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16 to 30.16

Ferroalloys.—Absolute stagnation is reported in the market for all grades of ferroalloys. Prices for ferromanganese and spiegeleisen are nominal and represent the asking price of sellers, but not the prices which it is believed a fair test of the market would bring out. It is confirmed that a carload lot of domestic ferromanganese was recently sold at $72.50, delivered, but the asking price is still $75, delivered. Some sellers of British alloy are quoting as low as $70, seaboard. There is no demand for spiegeleisen and the quotation varies from $26 to $31, furnace, depending upon the analysis, quantity and delivery. There is no demand for manganese ore. Ferrosilicon, 50 per cent, is nominally unchanged, the sale of two cars having been reported at around $65, delivered, in the Middle West. We quote prices as follows:

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton	$70.00
Spiegeleisen, 20 per cent, furnace, per ton	$26.00
Ferrosilicon, 50 per cent, delivered, per ton	$65.00
Manganese ore, foreign, per unit, seaboard	22c.

Warehouse Business.—Slackness continues and with recent lower prices by mills, warehouses here are looking forward to another reduction of prices in a short time. In brass and copper, business is poor and further reductions within a fortnight are generally considered inevitable. While the majority of dealers in sheets are maintaining a price of 4.50c. per lb. base on black sheets; 3.68c. per lb. base for blue annealed and 5.50c. per lb. base for galvanized sheets, there is a tendency to shade these prices, particularly in galvanized sheets, sales of which are being made by some dealers at 5.25c. per lb. Warehouses handling pipe are meeting competition on a basis proportionate to the mill reductions, but generally have not issued any new price schedule. The pipe prices quoted on page 252 represent the basis of from 60 to 70 per cent of sales, the remaining transactions being from 5 to 10 per cent under these discounts. In all materials, prices are largely nominal.

High-Speed Steel.—The market shows no change for the better. A few small orders continue from textile machinery builders. Producers generally are quoting about 90c. per lb. for 18 per cent tungsten high-speed steel with some sales reported at 85c. per lb. A good order would probably bring out a price satisfactory to the purchaser.

Finished Iron and Steel.—One of the interesting developments of the week is the placing with a jobber of 750 tons of concrete reinforcing bars for the Federal Reserve Bank at John and Nassau streets. A stipulation that the bars must be delivered in small lots on 24 hr. notice, cut to length, and thus requiring storage and cutting facilities not far remote from the point of use, was enough of an obstacle to keep mills from bidding low enough to get the work. It is understood that the unit price was somewhat higher than the minimum mill quotation on a delivered New York basis. Steel bars are now pretty generally obtainable

at 1.75c. base, Pittsburgh, and the common quotation for both plates and structural material is 1.85c., although these quotations are made on such relatively small lots that they do not represent what could be done on a large attractive order. Railroad car repair work is slowly materializing. It is believed that the New York Central has already distributed among eight car builders orders for repairs on 4000 cars and that possibly the volume of work will be doubled. The Buffalo Steel Car Co. will do the repairs on 500 cars for the Buffalo, Rochester & Pittsburgh Railroad; this car builder is also reported to have booked like sized orders for the Delaware & Hudson and the Erie. Elsewhere is reported the contract placed with the Canadian Car & Foundry Co. for 500 tank cars for Russia; it is believed that the tank parts at least will be made in the United States. In fabricated steel lines some activity is noted in apartment house construction on the part of builders who have refrained for months until now to engage on such ventures. One involving 1100 tons is to be erected at 110th Street and Riverside Drive. Another actively considered is to go up at Madison Avenue and Eighty-fourth Street. According to the report of the Bureau of Buildings for the Borough of Manhattan, business buildings other than those of the office type increased in number, measured by construction permits, about 67 per cent and in estimated cost about 150 per cent in the first six months of 1921 against the corresponding period of 1920. New tenement and apartment houses have increased from 15 last year to 42 this year. A viaduct at 134th Street and Riverside Drive is a project of the immediate future and will take 350 tons. The marine terminal at Wilmington, Del., 1000 tons, is still open. Contracts awarded include 900 tons for the Nesquehoning bridge of the Central Railroad of New Jersey to the Bethlehem Steel Bridge Corporation, which has also taken 250 tons for two or three bridges; 750 tons for the Amoskeag bridge to the Phoenix Iron Co., for which the Boston Bridge Works will do the erecting; 4800 tons for 50 tanks for the Sinclair Consolidated Oil Co., one-half to the Chicago Bridge & Iron Works and one-half to the Graver Corporation, Chicago.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.13c. to 2.28c.; plates, 2.18c. to 2.38c.; structural shapes, 2.18c. to 2.38c.; bar iron, 2.28c.

Cast Iron Pipe.—The usual mid-summer lull has finally struck this line of industry, there being a halt to inquiries and orders. Some pipe foundries are shutting down temporarily, ostensibly to make repairs, but probably because of lack of business as well. The 1500 ton contract which the City of New York was to have awarded last week has been postponed, specifications having been recalled and no reasons given. We quote f.o.b. New York, carload lots, as follows: 6-in. and larger, $52.30; 4-in. and 5-in., $57.30; 3-in., $67.30, with $4 additional for Class A and gas pipe.

Old Material.—The chief feature last week was the buying of an eastern Pennsylvania consumer, other than the Bethlehem Steel Co., of heavy melting steel at a delivered price of $12 a ton, which it has laid down in its yards. Some of the purchases were made in this district. There is less change in prices this week than for some time, indicating perhaps that prices have reached a somewhat permanent bottom.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$7.00 to $7.50
Rerolling rails	9.50 to 10.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	9.50 to 10.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.00 to 10.50
Wrought iron track	7.25 to 7.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	8.50 to 9.00
Light iron	2.00 to 2.50
Cast borings (clean)	3.50 to 4.00
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	7.00 to 7.50
Stove plate	8.50 to 9.00
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	7.00 to 7.50
Old car wheels	10.00 to 10.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	14.00 to 15.00
No. 1 heavy cast, not cupola size	13.00 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Buffalo

BUFFALO, July 26.

Pig Iron.—The volume of sales from week to week does not change and while the week just closed was no better than its immediate predecessors in point of tonnage, there is an appreciable feeling of optimism. Depletion of the stock of iron with one combination interest to the point where it must blow in a furnace or buy iron elsewhere, will probably result in the former step—thus accounting for its inquiry for a large tonnage of coke and the receipt of the first ore of the season. Decision to operate a blast furnace for its own use is expected daily. Present prices on pig iron are not attractive to this producer and the furnace operation will be generally confined to tonnages sufficient for its own use. In the same connection this interest continues to quote at $25 and $26, but of course these prices are prohibitive. On the basis of present sales the furnace which expected to blow out its only stack in blast will find sufficient to keep going for the present. Its total movement last week was 1000 tons at $20 and $22 base. Inquiry has fallen off with the steelmaking producer which sold Buffalo iron at Eastern points and total orders are less than 500 tons. The necessity of filling orders on old contracts has practically forced one producer out of the market—at least for new business. Its stocks are depleted to the point that it will not figure actively on inquiries amounting to 4100 tons. Sales of 100 tons of malleable at $23 and 500 tons of extra high silicon at $23 represent the only new business. The largest local buyer is known to be in the market for 1700 tons for use in Buffalo plants.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$21.75 to $22.75
No. 2X foundry, 2.25 to 2.75 sil.	20.75 to 22.00
No. 2 plain, 1.75 to 2.25 sil.	20.00 to 21.00
Basic (nominal)	20.00 to 21.00
Malleable (nominal)	21.00 to 22.00
Lake Superior charcoal	36.00

Finished Iron and Steel.—Several factors unite to justify an expression of better feeling. There is a probability of increased operation and requests are in for bids on a number of sizable structural jobs which have been held up many months awaiting normal prices. The general trend of mill business is about the same scale which has characterized this year's activity. Bars and pipe show better movement while plates are dull. Branch offices of national mill interests have been instructed on new prices they will quote. Pipe business shows local improvement with the purchase of 500 tons for use in the plumbing work on the new Hotel Statler and an inquiry for 800 tons for the steamfitting work on the same job. A number of orders for steel piling, ranging in size from 100 to 300 tons, reveal improvement. In structural work bids for the J. N. Adam hospital at Perrysburg, N. Y., involving 1000 tons; and three buildings as additions to the Eastman Kodak Co., Rochester, N. Y., exceeding 1000 tons, and announcement by the successful bidder for the new schools at Buffalo, to the effect that the city will be refunded any saving resulting from further reduction in prices of materials, all indicate improved demand. Bars are now quoted at 1.75c.; shapes 1.85c. and plates 1.85c.; black sheets 3.25c. and galvanized 4.25c. Canadian business is quiet and in proportion mills are doing less than their border competitors. A number of reinforcing bar inquiries are out, but the one mill which is the chief contender for the business and which expects to start operations if the business comes its way has not announced the names of the prospective customers or the tonnages involved. A sheet mill down for several weeks expects to operate August 1.

Warehouse Business.—Price reductions are expected daily with announcements from mills that new schedules are in force. Orders have been more frequent—particularly for structural shapes and sheets. Railroad inquiry indicates not only repairs to rolling stock but a definite program for new equipment. Some of this is in the warehouses, but the general volume of

railroad business is small. A more settled feeling is reflected among warehouse customers; in substance, it is that the next price announcement will be the last and that a stabilized market will follow.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 3.05c.; plates, 3.05c.; plates, No. 8 gage, 3.65c.; soft steel bars and shapes, 2.95c.; hoops, 3.65c.; blue annealed sheets, No. 10 gage, 3.70c.; galvanized steel sheets, No. 28 gage, 5.80c.; black sheets, No. 28 gage, 4.80c.; cold rolled strip steel, 7.15c.

Old Material.—Inquiry for heavy melting steel revived talk that the railroad equipment maker who bought heavily in the winter was again in the market, but no sales were consummated. While trading is at a standstill, in general dealers are more encouraged.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$11.50 to $12.00
Low phos., 0.004 and under	15.00 to 16.00
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Heavy axle turnings	8.00 to 9.00
Grate bars	9.00 to 10.00
No. 1 busheling	9.00 to 10.00
Stove plate	12.00 to 13.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

Boston

BOSTON, July 26.

Pig Iron.—One New England melter this week bought two 500 ton lots special analysis iron at a price based on $21 Buffalo furnace for No. 2X, an eastern Massachusetts foundry increased an order for 200 to 500 tons eastern Pennsylvania No. 1X at $23.50 furnace or $27.56 delivered, and another Massachusetts concern purchased 300 tons Lake charcoal iron at a price understood to have been below the market, but aside from these transactions, business was confined to scattered car lots, mostly to Massachusetts melters. Indications are the flurry in buying has spent itself inasmuch as the ratio of daily melts, the amounts of iron in yards and due foundries on old contracts are such that further purchases other than filling-in orders to round out mixtures are not warranted. Buffalo high silicon iron is offered on a basis of $20 furnace for No. 2 plain in large lots and at $20.50 in small. The supply of eastern Pennsylvania iron at $20 is drying up, while Virginia and Alabama furnaces are not anxious for business on any such basis. Delivered pig iron prices follow:

East. Penn., sil. 2.25 to 2.75	$25.06 to $28.81
East. Penn., sil. 1.75 to 2.25	24.56 to 28.31
Buffalo, silicon 2.25 to 2.75	25.96 to 28.96
Buffalo, silicon 1.75 to 2.25	25.96 to 28.46
Virginia, silicon 2.25 to 2.75	31.08 to 33.08
Virginia, silicon 1.75 to 2.25	30.58 to 32.58
Alabama, silicon 2.25 to 2.75	32.16 to 32.66
Alabama, silicon 1.75 to 2.25	31.66 to 32.16

Coke.—Additional tonnages of coke were booked this week on a $10.91 delivered basis where the freight rate does not exceed $3.40. The volume of new business was not sufficiently large to noticeably change the ratio of production and daily shipments of New England by-product fuel makers. Among foundries there appears a tendency to buy on a spot basis rather than a contract. One large textile machinery interest, however, this week covered on last half requirements for one of its plants.

Old Material.—Consumers' interest in old material continues at a minimum. A large majority of the New England foundries have sufficient material on hand to supply needs during the next month or two, at least. For that reason, yard interests are more inclined to shade prices on stock consumed in this section. Massachusetts melters this week took four cars No. 1 machinery at $16.50 to $17 delivered, otherwise the market is lifeless, according to local dealers. Two cars of stove plate were taken by nearby foundries at $14.50 and $15 delivered, or about 50c. a ton under the general quotation a fortnight ago. A small tonnage of relaying rails sold at $1.65 per 100 lb. and another lot at 2¼c. per lb. shipping point, which in this case was Cape Cod. Negotiations are on between dealers for a round tonnage of steam car wheels, but there is some hitch on price. Three cars of rolling mill borings were taken by Pennsylvania mills at $9 a ton delivered. Sentiment among New England yard interests is that steel mills will be in the market for large tonnages of heavy melting material by the middle of August provided they can purchase at prices ruling to-day or cheaper.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$16.50 to $17.00
No. 2 machinery cast	15.00 to 15.50
Stove plate	14.50 to 15.00
Railroad malleable	12.50 to 13.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	6.50 to 7.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.00 to 3.50
Cast iron borings, chemical	3.50 to 4.00
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.00
Rerolling rails	9.00 to 10.00

Cincinnati

CINCINNATI, July 26.

Pig Iron.—An increase in both inquiries and sales over last week is noted in nearly every quarter. In most cases, however, only carload lots for prompt shipment are wanted, but two 100-ton lots of Southern iron for the Pittsburgh district are included in the inquiries. A West Virginia steel maker was in the market last week for a car of 50 per cent ferrosilicon which it is believed was bought at $65, delivered, and a carload sale of Bessemer ferrosilicon, 10 to 12 per cent, to an Illinois car manufacturer was made at lower than $45.25, delivered. A radiator company is inquiring for 250 tons of foundry iron. A Michigan melter is considering prices on 3000 to 5000 tons for shipment to Dec. 31 next.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$24.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.00
Ohio silvery, 8 per cent sil	38.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	23.52

Finished Iron and Steel.—There is a slight improvement noticed in both inquiries and sales, although quantities continue light. Orders for the most part specify immediate delivery. In wire and wire nails, the demand has been fair, prices being fairly firm. In pipe, despite the recent price change, the volume of business remains virtually the same. A carload sale of cold-rolled steel is noted and some activity in cotton ties is reported. The Masonic Temple at Birmingham involving 180 tons, was awarded to the Ingalls Iron Works, Birmingham, during the week. The Covington station project, previously reported, will involve 80 tons of structural material. The proposed plans of a new 11-story club house for the Business Men's Club, Cincinnati, are on display for the members. No actual work is contemplated, however, until expected adjustment of wages and materials in the building trades has taken place. The plant of the American Rolling Mill Co., Middletown, is expected to continue in operation throughout next week. The plant of the Newport Rolling Mill Co. is still shut down.

Warehouse Business.—Local jobbers report that buying is, if anything, better, although quantities are still light and for current needs. Orders for plates and concrete bars, in one house at least, have been the leading activity. Prices remain unchanged.

Iron and steel bars, 3.15c. base; hoops and bands, 3.85c. base; shapes, 3.25c. base; plates, 3.25c. base; reinforcing bars, 3.22½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.85c.; No. 28 black sheets, 4.92c.; No. 28 galvanized sheets, 5.92c.; wire nails, $3.50 per keg base; No. 9 annealed wire, $3.10 per 100 lb.

Coke.—The coke market was very quiet during the week. A sale of 1150 tons and another of 1100 tons

are noted. There has also been some scattered carload business. Prices remain unchanged.

Old Material.—The scrap market continues at a standstill. There is practically no trading.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$4.00 to	$5.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
Per Net Ton		
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.00 to	2.50
Steel turnings	1.00 to	2.00
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	4.00 to	5.00

St. Louis

ST. LOUIS, July 23.

Pig Iron.—A sale of 300 tons of foundry iron to the American Radiator Co. for its Edwardsville, Ill., plant is reported at about $18.25 Chicago for No. 2. A survey of foundries in this territory made by a manufacturer reveals that for the most part they are running very light and are well stocked. But there is some improvement in the demand for a general line of castings from the railroads and foundries catering to that trade are operating 50 per cent or more of capacity. A St. Joseph, Mo., foundryman here this week was optimistic over the railroad situation. There was an inquiry in this market for one car of ferromanganese and the first sale in months of a car of spiegeleisen was reported.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry No. 2	$21.30 to $21.80
Northern malleable	21.30 to 21.80
Basic	21.30 to 21.80
Southern foundry, sil. 1.75 to 2.25	25.74 to 26.24

Finished Iron and Steel.—A stir was caused here this week by the announcement of a cut to 1.75c. Pittsburgh for bars and 1.85c. for structural shapes by one of the large independents, which was quickly met by other independents. The Illinois Steel Co., the Steel Corporation's subsidiary here, has made no change from its readjustment of July 5. A few sales of bars were made at the price quoted. Additional inquiries for structural steel create a better feeling in the trade. Sanguinet & Staats, architects, Dallas, Tex., are receiving bids until August 1 for the Frost National Bank Building, San Antonio, involving 350 tons of structural steel and 350 tons of reinforcing bars. For the new Missouri Pacific hospital, 150 tons of bars will be required. The building trade labor situation looks better, the unions now voting on the final draft of an agreement designed to prevent strikes and lockouts and to fix wages by arbitration. The railroad situation is improving. The Missouri Pacific let a contract for repairs to 500 cars to the Sheffield Car & Equipment Co., Kansas City. While these are wooden freight cars, a fair tonnage of castings is involved. The Western Steel Car & Foundry Co., Davenport, Ia., has an order to repair 300 combination cars for the Wabash. These two lettings are regarded as hopeful signs of a resumption of railroad car activities. Then, too, the railroads are beginning to buy wheels, structural shapes and bars in small lots for repairs. The purchase by the St. Louis Terminal Railway of two carloads of standard track spikes is reported. The railroads and the United (Street) Railways seem well covered on rail tonnage. Warehouse business is light and so far mill reductions noted above have not been met.

For stock out of warehouse we quote: Soft steel bars, 3.02½c. per lb.; iron bars, 3.02½c.; structural shapes, 3.12½c.; tank plates, 3.12½c.; No. 10 blue annealed sheets, 3.77½c.; No. 28 black sheets, cold rolled, one pass 5c.; No. 28 galvanized sheets, 6c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, $4.12½ per 100 lb.; boiler rivets, $4.22½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon, blank, $3.25; and tapped, $3.00 off list.

Coke.—The demand for coke is still confined to a few carload orders, with most of the business being handled by the Laclede and Granite City by-product plants. Standard Connellsville beehive foundry is quoted at $5 ovens, or $10.04 delivered St. Louis, Granite City by-products meeting this price, while Laclede by-product foundry is quoted at $11.50 ovens, or $11.70 delivered in the St. Louis industrial district.

Old Material.—Consumers continue to decline to come into the market and prices of some grades have again declined. Re-rolling rails, however, are holding firm at $12 to $12.50. One dealer reports the sale of a tonnage of light section relaying rails around $30, gross ton, St. Louis. The following railroad lists were before the market this week: Chicago, Burlington & Quincy, 5000 tons; Texas & Pacific, 750 tons; Kansas City Terminal, 200 tons.

We quote dealers' prices, f.o.b. consumer's works, St. Louis industrial district and dealers' yards as follows:

	Per Gross Ton	
Iron rails	$12.50 to	$13.00
Steel rails, rerolling	12.00 to	12.50
Steel rails, less than 3 ft	10.00 to	10.50
Relaying rails, standard section	28.00 to	30.00
Cast iron car wheels	11.00 to	11.50
No. 1 railroad heavy melting steel	9.50 to	10.00
No. 1 heavy shoveling steel	9.00 to	9.50
Ordinary shoveling steel	8.50 to	9.00
Frogs, switches and guards, cut apart	9.50 to	10.00
Ordinary bundled sheet	4.00 to	4.50
Per Net Ton		
Heavy axle and tire turnings	$5.00 to	$5.50
Iron angle bars	10.50 to	11.00
Steel angle bars	8.00 to	8.50
Iron car axles	17.00 to	17.50
Steel car axles	12.00 to	12.50
Wrought iron arch bars and transoms	12.50 to	13.00
No. 1 railroad wrought	9.00 to	9.50
No. 2 railroad wrought	8.50 to	9.00
Railroad springs	9.50 to	10.00
Steel couplers and knuckles	9.50 to	10.00
Locomotive tires, 42 in. and over, smooth inside	8.00 to	8.50
No. 1 dealers' forge	6.00 to	6.50
Cast iron borings	5.50 to	6.00
No. 1 busheling	9.00 to	9.50
No. 1 boilers cut in sheets and rings	5.50 to	6.00
No. 1 railroad cast	11.50 to	12.00
Stove plate and light cast	10.50 to	11.00
Railroad malleable	9.00 to	9.50
Agricultural malleable	9.00 to	9.50
Pipes and flues	6.50 to	7.00
Heavy railroad sheet and tank	6.00 to	6.50
Light railroad sheet	3.00 to	3.50
Railroad grate bars	7.50 to	8.00
Machine shop turnings	4.00 to	4.50
Country mixed iron	6.00 to	6.50
Uncut railroad mixed	7.00 to	7.50
Horseshoes	9.00 to	9.50
Railroad brake shoes	7.50 to	8.00

Birmingham

BIRMINGHAM, ALA., July 26.

Pig Iron.—The last week in July began with a base of $20, the bulk of business being done at that figure, but some at $19.50 and some was reported but not confirmed at $19. Indications pointed to settling around the $20 base. The largest transaction coming to the fore was 500 tons for a sanitary manufacturing interest. One furnace interest sold 1500 tons during the week ending July 23 and two others in proportion. The make had dwindled to one merchant stack and four on basic for company use. Manufacturing interests not now making iron have turned over customers to one another when out of certain grades on yards. Ill assortment of stocks is becoming more pronounced and begins to interest the consumer. Furnace operators do not report much progress in requests for lower assembling and shipping rates that have been made to the trunk lines. The only reductions of importance have been those in export rates, which, effective July 15, became, to Mobile, as follows: Pig iron, $2.75 instead of $4.13; pipe, $3.13 instead of $4.60. These rates are the same as the rates to Mobile when products are intended for the Pacific Coast.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.50 to $20.00
Basic	19.00
Charcoal	35.00

Finishing Mills.—The Tennessee company closed down the Fairfield plate mill at the end of the week, but will operate its Bessemer mill in a small way. Four blast furnaces will continue in operation and the rail and car mills are around normal. The new car plant

is taking on additional men and speeding up. Ingalls Iron Works is on full turn, making steel bridges for the Philippines, office buildings and structural steel with more business in sight. The Conners-Weymann Co.'s steel hoop mill at Woodlawn resumed at Woodlawn on single turn this week. The Gulf States Steel Co.'s bar mill went from two to five days turn this week. New business shows a marked gain over the recent low mark.

Coal and Coke.—By-product coke is offered at $6 with beehive ruling at $6.50. Coke market is fair. Governor Kilby will announce Aug. 1 his fair price list on domestic coals for householders.

Cast Iron Pipe.—Little was done in high pressure pipe, the United States Cast Iron Pipe & Foundry Co. and the National Pipe Co. securing small Middle Western orders. Flange pipe for oil wells is not heard of at this time. The leading interest is operating part time at Bessemer and Anniston, while Birmingham and Chattanooga are down. The base is $40 for large sizes and desirable business. The Emory Pipe Co., which recently resumed, is on full turn in its Anniston sanitary pipe shop. The base is $40.

Old Material.—The scrap market remains listless with no interest outside of No. 1 cast and similar materials.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Cleveland

CLEVELAND, July 26.

Iron Ore.—With not an inquiry developing nor a sale reported during the week, the market is at a standstill. Shippers expect that there will be virtually no sales within the next few weeks but look for a limited volume of business early in the fall from consumers who will want a little more ore to carry them over the winter. Only one report has appeared of any price shading on Lake Superior ore. A concession from the regular schedule was offered by a small mining company that markets its own ore and its production is not of sufficient size to make it any factor in the market. It is not unusual for a few of the very small producers to shade regular prices during a dull season. July shipments will show little gain over June. The lake coal traffic has fallen off and more boats are being laid up.

Reports from Duluth announce that the Oliver Iron Mining Co. has made a further reduction in miners' wages of approximately 10 per cent to become effective August 1. This is the second wage reduction by this company, the first being 20 per cent, which was placed in effect May 16. A further curtailment in the company's mine operations will also be made.

Semi-Finished Steel.—While a further reduction of $3 a ton has been announced on billets, sheet bars and slabs, prices on these are not established. A Cleveland mill is in the market for 2500 tons of slabs on which it has been quoted $31 by a Pittsburgh district mill, but claims to have previously been able to purchase slabs at $30.40, Youngstown, and expects to be able to shade that price considerably.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Some of the furnaces in the Cleveland district seem inclined to take no further part in the downward movement in prices and state that $20 for foundry iron is as low as they will go at present. Although lower prices have appeared in the Pittsburgh district, $20 for foundry iron is generally quoted as the minimum base price in this market, but there is considerable irregularity in the price differential for higher silicon irons. The volume of business during the week was very light. One interest sold 1100 tons in lots of 200 tons and under at $20 and $20.50 for No. 2. Almost no sales were made in the immediate territory. Quotations were named on inquiries for 200 tons for the U. S. Sanitary Co., Pittsburgh, 250 tons for the Union Radiator Co. and 200 tons for the American Radiator Co. The Ford Motor Co. is reported to have taken additional work away from Ohio foundries and centered it in Detroit, and this has had the effect of curtailing the consumption of Ohio iron, although the Ford company has for some time been supplying these foundries with much of the iron for its own castings. Two sales of low phosphorus iron, each of 100 tons, are reported at $36 and $36.25. A Valley producer reports that Alabama competition in low phosphorus iron has developed in the Northwest, where this grade has been offered at $33, Birmingham.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.46 to $20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	28.92
Ohio silvery, sil. 8 per cent	38.86
Standard low phos., Valley furnace	36.00 to 36.25

Coke.—The market shows no change. Quotations on standard Connellsville foundry coke range from $4 to $5, and sales during the week were limited to a few car lots, mostly of the higher priced grades.

Bolts, Nuts and Rivets.—Bolt and nut prices are weak, regular quotations being shaded from 5 to 10 per cent on desirable orders. However, in spite of the recent price reductions on steel bars, makers do not seem inclined to make a further formal price reduction, saying that present steel bar prices were fully anticipated in the reductions that had been made on bolts and nuts. The market is a little more active. Some fill in orders are coming from the jobbers and there is more inquiry from the railroads. The rivet market continues very dull. The leading Cleveland maker is declining to shade 2.75c. for structural rivets and 2.85c. for boiler rivets, although prices $2 a ton lower are evidently appearing in other districts.

Finished Iron and Steel.—Prices on finished iron and steel again declined sharply during the week and there is now an open market on nearly all items. Several mills late in the week informally made a $3 a ton reduction on steel bars, plates and structural material from the prices that were formally named July 5 but which were not closely adhered to. These new prices are 1.75c. for steel bars and 1.85c. for structural material. While these prices may be holding a little better than the previous ones, lower quotations are appearing. The plate market particularly is weak with quotations as low as 1.70c. for tank plates. However, it is claimed that boiler plates are holding fairly well at 1.85c. While the Steel Corporation has made no formal announcement of lower prices, it is meeting competition. The lower prices are bringing out more inquiry for small lots, mostly for immediate delivery, indicating that stocks are low. Interest in the price situation is centered in an inquiry from the Mt. Vernon Bridge Co. for 6900 tons of steel bars, plates and structural material. This company during the week took the steel work for the Ohio State University stadium, Columbus, 4360 tons, for $303,000, or $69.50 a ton delivered and erected, and is about to place the steel for this and other work taken recently. It is freely predicted in the trade that this steel will be purchased at about 1.60c. Regular quotations on hard steel bars have declined $1 a ton to 1.70c., but an inquiry for 1000 tons for reinforcing work for the Ohio State University stadium brought out a quotation of 1.90c. delivered or 1.62c., Pittsburgh. A local order for 230 tons of reinforcing bars for an apartment house was taken by a Cleveland warehouse for stock shipment at about 2c. delivered on the job. Following a court order enjoining the placing of a contract for the Baldwin reservoir, Cleveland, the city has decided to readvertise for that work requiring 1700 tons of reinforcing bars. Some round lot business in soft steel bars has been taken at 1.75c. Lower quotations than have

previously appeared are being made on various items. Hoops are quoted at 2.40c. or lower, bands on a 1.90c. bar base with the old bar card extras, hot-rolled strip steel at 2.35c. to 2.40c. and light rails at 1.75c. to 1.80c. Akron has awarded 1800 to 2000 tons of lock bar pipe to the East Jersey Pipe Co. of New York.

Jobbers quote steel bars 2.79c.; plates and structural shapes, 2.89c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.40c. to 3.55c.; hoops and bands, 3.44c.; cold rolled rounds, 4c.; flats, squares and hexagons, 4.50c.

Sheets.—The sheet market is weak and unsettled with prices appearing on all grades $5 a ton lower than those that prevailed a week ago. Quotations are being made as low as 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, and there are reports of a 3.90c. quotation on the latter. Price reductions have done little to stimulate sheet business. The Ford Motor Co. during the week placed 1000 tons of high grade blue annealed sheets for crank cases with a Valley district mill at 2.50c. Mills report small lot sales at 3.15c. for black and 4.15c. for galvanized.

Warehouse Business.—A leading local jobber has reduced warehouse prices $5 a ton on black and galvanized sheets and $3 a ton on blue annealed sheets. Other local warehouse prices have not yet been changed. Detroit jobbers reduced warehouse prices July 22 from $3 to $5 a ton.

Old Material.—The market is almost at a standstill and many dealers are not attempting to do any business. One local mill is still accepting shipments of heavy melting steel on old contracts and dealers are paying $11 for selected material to fill its orders. One dealer is buying heavy melting steel for yard stock, making purchases of this grade at $10.50 to $10.85. Prices generally are unchanged, although cast scrap is lower, evidently being affected by the recent decline in pig iron prices.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$10.50 to $11.00
Steel rails, under 3 ft	11.50 to 12.00
Steel rails, rerolling	13.00 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	6.50 to 7.00
Machine shop turnings	4.50 to 4.75
Mixed borings and short turnings	6.50 to 7.00
Compressed steel	6.00 to 6.50
Railroad wrought	10.00 to 10.50
Railroad malleable	11.00 to 12.00
Light bundled sheet stampings	3.50 to 4.00
Steel axle turnings	8.00 to 8.50
No. 1 cast	15.00 to 15.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	12.75 to 13.00
Pipes and flues	6.00 to 7.00

Hurrying Taxation Legislation

WASHINGTON, July 26.—Speeding up of the revised tax legislation in response to the demands of the country is indicated by the fact that it was stated by high authority to-day that the House may be able to pass the measure and turn it over to the Senate by Aug. 6. While not assured this will be done, efforts are understood to be under way in that direction, despite the claim of prominent House leaders that the measure cannot pass the House before Sept. 1.

Hearings on tax revision were begun to-day before the Committee on Ways and Means. The evidence points to the fact that some of the fundamental principles of tax revision will include elimination of excess profits tax, modification of the surtax and restoration of a higher tax on first-class mail in order to make up the deficit of the parcel post. An effort is to be made by Congress to bring about diminution of taxes by reducing expenditures, though some leaders of Congress think decrease, if any made, will be small. Should the new tax bill get over to the Senate before the completion of hearings on the tariff, which will last two weeks or more, it is proposed to pass the tax legislation first. Sentiment for a recess of Congress after tax legislation passes the House is increasing.

Philadelphia

PHILADELPHIA, July 26.

Further price reductions have been made in semi-finished steel and mild steel bars, to which is attributed improvement in orders, particulary from jobbers who are taking this opportunity to round out stocks. The improvement has inspired one prominent steel company with plants in both eastern and western Pennsylvania to increase operations to a general average of 40 per cent, new business having come in just when some departments were on the point of shutting down.

Rerolling and forging billets and slabs have been reduced $3 from a week ago, now being quoted at $30, $35 and $31, respectively. Mild steel bars have been lowered to 1.75c. from 1.90c. a week ago.

A Buffalo steel plant, doing business in the Philadelphia district and down for some time, is rumored to be on the point of starting up in a week; the Midvale Steel & Ordnance Co., favored with some of the Belmont Iron Works orders and other new business, has either resumed idle departments or failed to shut down departments which it previously contemplated doing. The Reading Iron Co. started two mills Monday. The Alan Wood Iron & Steel Co. expects to resume partial operations next week.

On the contrary, two furnaces are seriously considering going out of blast. A certain degree of optimism exists in the pig iron trade, though to a less extent than in steel lines, because of the severe price slashing. There are 100,000 tons of iron piled in furnace yards in eastern Pennsylvania. Though no sales absolutely prove it, foundry iron is obtainable at $19 base.

Brokers in old material realize that there is a scarcity of scrap, owing to low production of manufacturers. Consequently they are hastening to cover on short buying.

There is a report of a purchase by an oil refining company of 8000 tons of plates, 1200 tons of bars and shapes and 15 or 20 carloads of pipe. There is one inquiry for 600 tons of foundry iron.

Pig Iron.—Furnaces have viewed with some concern the keen competition which has brought iron down to a $20 base. Now, positive offerings have been made at $19, base, though no sales at this figure have come to light. Prices are very mixed, in some cases little price distinction being made between No. 2 plain and No. 2X; some of the higher silicon iron has been sold at a rate that, if the usual $1 were observed, would bring the base, price below $20, the old-time differentials being ignored. Some optimism is expressed on the part of those who believe that the recent slash was the last and that the market will work upward. However, it is estimated that there are 100,000 tons of iron piled in eastern Pennsylvania yards and that it will take considerable buying to raise prices. There is talk of two more furnaces going out of blast, one of which recently blew in on low phosphorus. The Ingersoll-Rand Co. is inquiring for 700 tons of foundry iron, 500 of which is 1.75 to 2.25, the rest 2.25 to 2.75 silicon. There is another inquiry for about 250 tons of foundry iron, half of which is No. 2 plain and half No. 2X. A sale of 100 tons of basic was made a few days ago at $23, furnace, but it is agreed that basic could be obtained at $20 today, and possibly $19, furnace. One iron agent reports sales for July as five times as great in volume as in June. Some state that no more iron will be sold at a sacrifice for liquidating purposes because the banks are now more ready to loan cash.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.35 to $20.75
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.35 to 22.25
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.74 to 31.74
Virginia No. 2X, 2.25 to 2.75 sil.	30.74 to 32.99
Basic deliv. eastern Pa.	21.25 to 22.00
Gray forge	22.00 to 23.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	38.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Because of the low operations of steel plants, there is but little demand for ferromanganese or spiegeleisen. The most general quotation for the former is $75, delivered east of the Mississippi, for do-

mestic, and $75, seaboard, for British. It is rumored that it was offered to a West Virginia steel plant at $65. Spiegeleisen is generally quoted at $27. The Bettendorf Co. is reported to have bought a carload of spiegeleisen.

Plates.—The price at which the plates were sold recently to the Belmont Iron Works is carefully kept secret, but a lower price is reported. It is rumored that the Gulf Refining Co. has purchased 8000 tons of plates, part of which will be used for storage tanks on the Delaware River. No action will be taken on bids on plates for ships for the Red D line for a month. The chief plate demand is for oil tanks, with some inquiries from railroads for car repair work. The rumor persists that the Pennsylvania Railroad will soon ask for large tonnages.

Structural Material.—It is also stated that the Gulf Refining Co., in addition to its purchase of plates, has bought 1200 tons of shapes and bars. Structural shapes are generally quoted at 1.85c., but there are evidences of shading. There are considerable inquiries for structural shapes for new buildings and especially for extensions and remodeled structures, though few orders result.

Semi-Finished Steel.—The Midvale Steel & Ordnance Co. now asks $30 for re-rolling billets, $35 for forging billets and $31 for slabs, all Pittsburgh, which is a $3 reduction within a week on each.

Sheets.—It is rumored that a Youngstown plant secured the order for the 1500 tons of sheets bought by the Belmont Iron Works. Blue annealed are usually quoted at 2.50c., black at 3.25c. and galvanized at 4.25c., Pittsburgh.

Bars.—Steel bars are uniformly 1.75c., Pittsburgh, as against 1.90c. a week ago. Bar iron is also 1.75c. The Reading Iron Co. started some of its mills Monday.

Pipes and Tubes.—The Midvale Steel & Ordnance Co. has revised its schedule on charcoal tubes as follows: 1¾ and 1⅞ in., list, less 10 per cent; 2 and 2¼ in., list, less 20 per cent.; 2½, 2¾ and 3 in., list, less 25 per cent; 3¼, 3½ and 4 in., list, less 27 per cent.

Bolts and Nuts.—The Belmont Iron Works is asking for 7000 turnbuckles and 2500 bolts, both ¾ in. Railroads are fairly active in buying spikes and bolts.

Old Material.—A better feeling exists, and it is more difficult for brokers to obtain material from dealers at present prices. Brokers who bought short are hastening to cover requirements. The improvement is partly due to the purchases by the Bethlehem Steel Co. of railroad and industrial heavy melting steel at the higher price of $12, delivered Bethlehem. Two concerns have been furnishing the bulk of this material, one in New York, the other in Philadephia. There has been some inquiry for stove plate and borings for delivery to the Philadelphia district, but at the prices offered difficulty was experienced in obtaining it. One inquiry called for No. 1 cast delivered to Baltimore.

No. 1 heavy melting steel	$11.00 to $12.00
Scrap rail	11.00 to 12.00
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.00 to 17.00
No. 1 railroad wrought	13.50 to 14.50
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.50 to 8.00
Mixed borings and turnings (for blast furnace use)	7.00 to 7.50
Machine-shop turnings (for rolling mill and steel works use)	7.50 to 8.00
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	9.00 to 9.50
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 17.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	11.00 to 12.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Iron car axles	No market
Steel car axles	No market

Warehouse Business.—Price revision downward was contempated Wednesday of this week, in view of the lower prices offered by mills. Jobbers have been inspired by reductions to lay in more stock and have themselves made sales of a trifle greater tonnages.

Soft steel bars and small shapes, 2.90c.; iron bars (except bands), 2.90c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ in. x ½ in., 3.20c.; round edge steel, planished, 3.95c.; tank steel plates, ¼-in. and heavier, 3c.; tank steel plates, 3/16-in., 3.20c.; blue annealed steel sheets, No. 10 gage, 3.65c.; light black steel sheets, No. 28 gage, 4.50c.; galvanized sheets, No. 28 gage, 5.50c.; square twisted and deformed steel bars, 2.90c.; structural shapes, 3c.; diamond pattern plates, ¼-in., 4.75c.; 3/16-in., 4.95c.; ⅛-in., 5.05c.; spring steel, 4.40c.; round cold-rolled steel, 4.50c.; squares and hexagons, cold-rolled steel, 5c.; steel hoops, No. 13 gage and lighter, 3.85c.; steel bands, No. 12 gage to 3/16-in. inclusive, 3.60c.; iron bands, 4.20c.; rails, 3.20c.; tool steel, 12c.; Norway iron, 6.50c.; toe steel, 4.50c.

Will Consider Freight Rates

PITTSBURGH, July 26.—The question of railroad freight rates on ore, coke and limestone will be thoroughly threshed out at a meeting to be held here soon between traffic officials of the railroad serving this section of the country and blast furnace and steel plant interests of the Pittsburgh and Valley districts. Statistics compiled by the traffic manager of one of the Pittsburgh independent steel companies shows that the present cost of assembling the materials used in making a ton of pig iron, including a charge of 40c. for slag disposal, is $10.44. This compares with $5.18½ in 1913 and $5.34½ in 1912. Comparison is made with 1912 and 1913 as being the last normal years prior to the war. In view of the fact that the market for basic pig iron in this district is not quotable at higher than $19 per ton at furnace, and that some iron recently has been sold at even less, pig iron producers must produce the raw materials, pay the cost of conversion and absorb other expenses for about $8.50. This, of course, cannot be done. If ore were still further reduced 50c. a ton to around $5 per ton at lower lake docks for non-Bessemer, it still would be impossible, even with labor at 30c. an hour, according to furnace operators, to get the producing cost of a ton of pig iron below $20 on current freight charges. These features of the situation will be presented to the railroad officials in the hope that something will be done in the direction of reducing freight rates.

Ore Rate Hearing at Chicago

On Monday, Tuesday and Wednesday of this week hearings were held at the Great Northern Hotel, Chicago, in the complaint of 82 independent iron mining companies against the ore carrying railroads of Minnesota, Wisconsin and Michigan. The hearing was held before Examiner Hosmer, acting for the Interstate Commerce Commission. The ore mining companies contend that the present freight rates on ore carried from the mines to upper lake ports are excessive and above the actual cost of the service plus the 6 per cent return to the railroads guaranteed under the Cummins-Esch law. The complainants in their brief filed with Examiner Hosmer say that the rates should be 70c., 60c. and 50c. per ton from the three rate districts in the ore region. The Lake Superior Iron Ore Association was represented at the hearing by its counsel, Jean Paul Muller, of Washington.

Associations Would Like to Intervene

WASHINGTON, July 26.—A petition was filed to-day with the United States Railroad Labor Board at Chicago by the National Association of Manufacturers, the National Founders' Association and the National Erectors' Association asking for permission to intervene as shippers in the case known as the Federated Shop Crafts, a union labor organization, against the Pennsylvania Railroad bearing on a decision of the Labor Board and relating to the negotiation of labor agreements. The decision is a substitute for the so-called national agreements effective under Government control of the railroads, and under it the Pennsylvania, through a ballot, attempted to ascertain who should represent its employees in negotiation with its officers. Unions of the shop crafts objected and sent out a counter ballot, warning all shop crafts employees not to vote the company's ballot, but to vote the union's ballot. A blank space on the union ballot would permit a vote for any other organization, but not for an individual representative.

British Iron and Steel Market

Iron Makers Starting to Resume Production—Continental Competition Active

(By Cable)

LONDON, ENGLAND, July 26.

Five Cleveland furnaces are now working, and it is expected that two more will be relighted shortly; but as ironmasters generally decline to resume production until costs are cheaper, stocks of the better grades of iron are diminishing, despite the fact that consumers are holding off on orders.

Continental producers are still receiving the bulk of the steel orders. German merchant bars are subject to irregular quotations ranging from £7 15s. ($27.59) to £8 5s. ($29.37) f.o.b. Quarter-inch plates are being sold at £8 5s. f.o.b. Number 5 gage wire rods are selling at £11 5s. ($40.05) cost and freight to Japan.

Vickers has been closed until Aug. 9, on account of a strike of woodworkers. No orders for ships or machinery have been received this year. Some North Lincolnshire steel works have restarted operations.

Tin plate quarters are sold to the East at 26s. to 27s. ($4.63 to $4.81) f.o.b. Prime stock plates of 20 x 14 in. are practically unobtainable at 28s. ($4.98) basis f.o.b. More mills are starting up; it is anticipated that there will soon be 20 per cent in operation.

Sellers of Belgian 24-gage galvanized sheets are asking £26 ($92.56) cost and freight to Buenos Aires. German 24-gage black sheets for galvanizing are being sold at £12 10s. ($44.50) f.o.b.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.56 per £1 as follows:

Durham coke	£2	2				$7.48			
Cleveland basic	6	0				21.36			
Cleveland No. 1 foundry	7	0				24.92			
Cleveland No. 3 foundry	6	15	&	£7	0*	24.03	&	$24.92	
Cleveland No. 4 foundry	6	15	&	7	0*	24.03	&	24.92	
Cleveland No. 4 forge	5	17½				20.92			
Hematite	7	0*				24.92			
East Coast mixed	8	0	&	7	5*	28.48	&	25.81	
Ferromanganese	18	0	&	14	0*	64.08	&	49.84	
Ship plates	14	10				51.62			
Boiler plates	19	0	to	21	0	67.64	to	74.76	
Tees	14	10				51.62			
Channels	13	15				49.95			
Beams	13	10				48.06			
Round bars, ¾ to 3 in.	13	10				48.06			
Rails, 60 lb. and up	10	0	to	15	0	35.60	to	53.40	
Billets	11	0	to	11	10	39.16	to	40.94	
Sheet and tin plate bars, Welsh	10	10				37.38			
Galvanized sheets, 24 g.	22	0	to	23	0	78.32	to	81.88	
Black sheets	18	10†				65.86			
Tin plate base box	1	4	to	1	8	4.27	to	4.98	
Steel hoops	17	0				60.52			
Cold rolled steel strip, 20 g.	26	10				94.34			

*Export price. †Nominal.

Resumption of Operations Slow—Pig Iron Scarce —Continental Competition

LONDON, ENGLAND, July 14.—Now that the coal trouble is settled and work resumed in the mines, there is a natural disposition to look for some revival in trade. It is beginning to be realized that improvement is going to take much longer than was formerly thought. At one time it was believed that whenever the coal trouble was out of the way, brighter conditions would at once follow. This is now seen to be impossible, but there is a confident feeling that the worst is over and, now that labor has settled down and that there are prospects of some settlement of the Irish question, there is a feeling of confidence without, however, undue optimism.

About the beginning of the month work was begun in all the collieries where conditions were favorable, but large bodies of men were nevertheless unable to find employment. Supplies of coal are now coming forward and at cheaper prices, but the figure demanded is still too high to enable economic working in many industries. Apparently 20s. per ton is considered to be the ideal price for coal if iron and steel manufacture is to be conducted at a profit and, despite pessimistic utterances that cheaper fuel seems a long way off, other opinions tend to the belief that such prices will be seen before the year is out. A fact to be remembered is that a decline in the demand for British pig iron may react on the coke demand. It is understood that very little blast furnace coke is being bought. It is also understood that coke will ease in price before long, and if so it will certainly be a great help to the iron and steel trades.

Up to last week there had been little resumption among iron and steel plants of the country. This was partly due to the fact that the amount of coal drawn from the mines had been disappointing, while prices have been prohibitive. It is believed, however, that when the first demand for fuel has been filled there will be a fall in values, but nobody can foretell accurately what the cost of industrial coal will be, and ironmasters are in no hurry to commit themselves to a resumption of operations until they have some more assurance that they will be able to produce at a profit. Meanwhile the cost of production of pig iron has been reduced in another direction. The official ascertainment of the average selling price of No. 3 Cleveland G. M. B. for the past quarter showed the figure to be 126s. 11.56d. per ton. As a result of the sliding scale, the blast furnacemen's wages on the North East Coast will be further reduced, which means that taking into account the reduction a few months ago, their wages are reduced this year from 170¼ per cent to 72¾ per cent above the standard.

At the moment supplies of foundry pig iron are pretty nearly exhausted owing to the stoppage of production. Consequently when foundries get started again it is likely that prices will firm up, although, of course, imports of foreign pig iron will increase. This competition continues keen and it is obvious that if the industry is to live here at all, lower selling prices must be made practicable.

In manufactured material, the resumption of operations must necessarily be slow. One or two works started last week and it is expected that some more will begin during this week, while in other cases it is possible operations will not be started for some time. As a matter of fact the bulk of these works are short of orders and, although there is a certain amount of inquiry, business is slow to mature, as the low quotations for Continental material naturally lead to the expectation that domestic manufacturers must make further cuts in prices. Fuel is, however, being accumulated for a resumption, but in some cases the managements are making no move and say they will not do so until there is a radical change in the situation.

Early Good Results Expected

WASHINGTON, July 26.—Impetus to iron and steel and other industries from which railroads buy heavily is expected to result from the request made of Congress by the President to-day in a special message asking that the War Finance Corporation be empowered to purchase railroad funding securities accepted by the Director General of the Railroad Administration in expediting settlements with carriers.

The President states, as had been anticipated, that $500,000,000 may be necessary, and that no appropriation from Congress will be required. His message carried nothing that had not been anticipated, but nevertheless was the source of considerable satisfaction and verified the understanding that the Administration and carriers had agreed upon a plan looking to quick settlement between the Government and the railroads by the latter informally agreeing to waive claims based on inefficiency of labor. This had been the greatest obstacle in conducting negotiations. It is believed the legislation required will be quickly enacted and that railroads will use money not only to settle obligations they owe to manufacturers, car builders and other suppliers of equipment, but will come into the market for new requirements, the amount of which has not been indicated. This, it is stated, will be an important factor in stimulating industry.

Sentiment Growing Better, Says Judge Gary

Issues Statement Following Meeting of Finance Committee of Steel Corporation — Sharp Decline in Earnings with Deficit After Paying Dividends

THE report of the United States Steel Corporation for the second quarter of 1921 shows the smallest net earnings since the first quarter of 1915, being $21,892,016, compared with $32,286,722 for the first quarter of 1921 and $12,457,809 for the first quarter in 1915. The lowest net earnings on record were for the last quarter of 1914, being $10,933,170. After deducting from the net earnings all charges and allowances and interest on bonds there remained a balance of $8,087,032 for the second quarter of 1921. The usual dividends of 1¾ on preferred and 1¼ on common were declared, requiring $12,638,700 and leaving a deficit of $4,571,668 compared with a surplus of $2,816,905 for the first quarter of 1921. The net earnings for the quarter ending June 30, the preceding quarter and the preceding three years were as follows:

Quarters	1921	1920	1919	1918
First	$32,286,722	$42,089,019	$33,513,384	$56 961.424
Second	21,892,016	43,155,705	34,331,301	62,557,391
Third	.....	48.051,540	40,177,232	42,961,589
Fourth	.....	43,877,862	35,791,302	36,354,165
Net earnings each year	.....	$177,174,126	$143,813,219	$198,834,569

The statement of earnings for the quarter ending June 30 was as follows:

Earnings

	Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding	Less Interest on the Subsidiary Companies' Bonds Outstanding	Balance of Earnings
April, 1921	$8,010,975	$674,320	$7,336,655
May, 1921	8,404,522	672,873	7,731,649
June, 1921	7,496,424	672,712	6,823,712
	$23,911,921	$2,019,905	
Net earnings			$21,892,016
Less charges and allowances for depreciation, and sinking funds on bonds			8,665,507
Net income			$13,226,509
Deduct:			
Interest for the quarter on U. S. Steel Corporation bonds outstanding		$4,934,477	
Premium on bonds redeemed		205,000	
			5,139,477
Balance			$8,087,032
Dividends on stocks of the United States Steel Corporation, viz.:			
Preferred, 1¾ per cent		$6,304,919	
Common, 1¼ per cent		6,353,781	
			12,658,700
Deficit			$4,571,668

Judge Gary's Statement

Following the meeting of the finance committee Judge Gary, chairman of the board, issued the following statement in regard to the business outlook:

"The business results of the Corporation for the last quarter, which were not exactly determined until to-day, are not surprising to anyone familiar with general conditions.

"Shipments have been small and prices received on products delivered have been very low compared with the cost of production. Many manufacturing concerns have been operating at a loss. This is about as censurable as insisting upon unconscionable profits. It cannot be long continued.

"We have been paying somewhat higher wage rates than many other basic lines of industry. We think reductions in these rates should follow, rather than lead, selling prices, particularly those involving the costs of living, which in some respects are still unreasonable. These are being surely, if slowly, forced down to a fair basis by the withholding of purchases on the part of consumers. Up to the present time, we believe, wage earners generally have not been paid too much, excepting always certain trades or vocations in which rates were, during the war, on one pretext or another, arbitrarily tripled or quadrupled, and still are attempted to be maintained. This does not apply to the steel industry.

"While business in many lines, including iron and steel, is still dull and hesitating, the outlook is not discouraging or doubtful. Sentiment has been for some time, and still is, growing better.

Headed in Right Direction

"As stated at the meeting of the American Iron and Steel Institute last May, industry is headed in the right direction. This means a great deal, for at some date in the future there awaits the biggest business this country has ever witnessed. The fundamental facts for this conclusion are assured. The undisputed figures amount to a demonstration.

"Just at present there are many reasons for believing our conditions are improving, even though we may not as yet have experienced, to a large extent, the good results. Readjustments were necessary and they have been and are progressing with beneficial effect. During the war extravagance in expenditures in many ways and departments, from the Government down, was stupendous. Energy and effort were bent in the direction of building up new and expensive organizations ostensibly to assist in winning the war; and hundreds of millions were squandered. There was an orgy of overcharging, over-spending and waste. This was natural and perhaps inevitable. Now we are witnessing a contrary disposition, also from the Government down, although not every man, woman and child is yet included in the effort to reduce, to economize and to save.

Co-operation After Conflict

"Apparently, we shall soon have actual peace throughout the world. Construction, co-operation and wisdom will supplant destruction, conflict and folly. Legislation will be calculated to assist rather than obstruct legitimate progress. Taxes, which now burden almost to the point of stagnation, will surely be gradually and reasonably modified. Our President has said publicly that business is the biggest thing in the world, which is equivalent to saying that food, shelter and clothing are first to be considered in discussion; therefore prosperity is essential to the progress and happiness of the nation. International, national and industrial peace will become stabilized, not as a result of combined force, but because of the good will and honest desire of righteous-minded people.

"The financial aspect of this country and other countries has been improving, and to most of us at least, looks bright. The banking institutions of the United States are sound. Our resources are enormous. Our people are ready, anxious and able to do business. Everyone is called upon to do his or her part in the endeavor to return to a sane and reasonable basis, and the sooner this opinion becomes practically unanimous the earlier will we reach the goal of prosperity, the apparent distance of which depends upon individual vision.

"We need not shout in triumph, but we are not compelled to feel despondent. The world has been very sick. Therefore full recovery is longer delayed. The further we proceed in the direction we are now going the faster will be the pace. With the continuous maintenance of law and order, securing individual freedom of action in legitimate effort, the economic position of this country will be invincible."

GERMAN MARKET IMPROVES

Demand Good Particularly for Export—Foreign Buying of Rails and Rolling Stock

(By Aerial Mail to London)

BERLIN, GERMANY, July 12.—Improvement in the tone of the German iron and steel market has made rapid progress during the past 10 days and compared with the recent dullness, demand for some rolled products has become pressing. The condition of the export market confirms the assumption that there is a general improvement. Not only is there an increase in foreign inquiries but the number of transactions closed and contracts awarded is larger. Germany is benefiting by the fact that England is at present counting very little in iron and steel export and added to this is the curtailment of production in the United States. Thus, the world's business in iron and steel is at present largely shared by the three principal Continental iron countries—Belgium, France and Germany. This has resulted in a slight relaxation of ruthless price cutting, but business with the Entente countries is still impeded by the prevailing uncertainty in regard to the 26 per cent export levy.

Average export prices to Holland at the beginning of July were as follows:

	Per Ton Fl.	
Bar iron	79	$24.57
Heavy sheets	79	24.57
Medium sheets	81	25.19
Light plates	84	26.12
Wire, rolled	82	25.50
Wire, drawn, per 100 kg.	9.65	3.00

Rhenish-Westphalian mills are booked with orders until October and many works are introducing new shifts. Industrial circles feel confident that business will register further improvement by autumn. Although the coal quota for smelters has been cut, supplies are regarded sufficient for present requirements. French minette ore is still offered in large quantities but demand is rather light, active propaganda being carried on to urge smelters to withhold purchases pending the removal of the Entente sanctions. Supplies of Swedish ore are satisfactory. There is slightly more activity in pig iron demand but there is still the pressure of stocks on hand. Foundry iron No. 3 (1.80-2.50 per cent silicon, 1 per cent manganese, 0.9 per cent phosphorus, 0.06 per cent sulphur) which is officially quoted at 1100 m. per ton ($14.30) plus a rebate of 50 m. per ton, is offered in the free market at 990 m. ($12.87). Ferromanganese, 75 per cent of English origin, is offered at £13/10 ($48.15) c.i.f. Dutch, and £15 ($53.50) German, seaboard.

Foreign Railroads Buy in Germany

Indications are that structural shapes are livening up. Fabricators have lately booked substantial export orders. Jugo-Slavia recently placed a large bridge order with two German firms. In the rail market, price changes have been slight. Finland is reported to be in the market for 8000 tons of rails and the Swiss Federal Railroads are also expected to invite tenders for rails before long. A movement is in progress to establish a German rail syndicate to handle foreign business more efficiently. Inquiries for bar iron are brisk and terms of delivery now average 6 to 8 weeks. Several mills, such as the Gutehoffnungshütte and the Rheinische Stahlwerke, are booked solid for the third quarter. Demand for sheets is slightly better but prices still tend downward. Following upon the dissolution of the wire convention, quotations immediately dropped below official list prices. Drawn bright wire last quoted at 230 m. per 100 kg. is now 200 m., while nails have receded from 270 m. to 230 m. Only the large works are in a position to close at these prices, the smaller plants being unable to follow in face of the high prices for rods, which have steadily advanced during the past fortnight and are now quoted around 2000 m. per ton. Supplies from the larger mills, as Krupp's, Gutehoffnungshütte, and the Hösch steel works, are limited, causing a scarcity in the market. We quote:

	Per Metric Ton Marks	
Ingots	1170	$15.21
Billets	1300	16.90
Iron bars	1800	23.40
Shapes	1750	22.75
Angles and tees	1670	21.71
Reinforcing bars	1780	23.14
Hoop iron	2200	28.60
Hoop iron, cold rolled	3400	44.20
Rounds, drawn, bright	2730	35.49
Flats	1730	22.49
Squares	1720	22.36
Rounds	1740	22.62
Sheets, heavy	1750	22.75
Sheets, medium	1800	23.40
Plates, light	1850	24.05
Plates, tank	2200	28.60
Wire rods	2000	26.00

Negotiations have been opened at Berlin with the Russian Soviet Government for another order for 100 locomotives, 3000 cars and 150 tons of rails. Representatives of Vickers, Ltd., of London, have arrived in Berlin to confer with German interests on joint action in Russia. The Saechsische Maschinenfabrik, vorm, Richard Hartmann Aktien Gesellschaft, at Chemnitz, recently booked an order for 500 locomotives for Japan. An offer has been made to the Jugo-Slav government by Germany to settle part of the war indemnity by the delivery of 85 complete railroad trains (locomotive and 50 cars) through the Barkhaus works. The cabinet council is stated to have principally accepted this offer provided no objections are raised by the Entente.

German manufacturers and exporters are displaying activity in the Palestine market. The Standard Bau und Industriebedarfs G.m.b.H. of Berlin, an oriental trading company specializing in trade with Palestine and border countries, which lately booked several orders for industrial equipment for Palestine, has consolidated with the Berlin export company of Hecht, Pfeiffer & Co.

Return to Piece Work

A statement has just been issued showing that the return to piece work is progressing. At the Erfurt plant, for instance, 50 per cent of the present pay roll is for piece work, compared with 16 per cent at the beginning of the year while the figures for the Lippstadt, Kassel and Spandau plants are 57 per cent against 20 per cent, 28 per cent against 7 per cent, and 50 per cent compared with no piece work, respectively.

M. Stomoniakoff, the newly appointed representative of the foreign trade department of the Russian Soviet Government at Berlin, is stated to have resumed negotiations with the trade organizations of the German machine tool industry for the delivery of precision machine tools. From a reliable source it is learned that an order for textile machinery, for which flax and wool are offered, is also under consideration. The monthly capacity of the rolling stock department of the Rheinische Metallwaren und Maschinenfabrik Aktien-Gesellschaft, at Düsseldorf, is given as 30 locomotives and 300 cars. Locomotives form one of the new products of this company.

Living Costs Increase

The employers' associations in the Thuringian metal and engineering industries have decided upon a wage cut of from 1 to 16 per cent in the machine industry, and 10 to 50 per cent in the small iron ware industry, for competitive reasons. The heavier cuts will be made in the wages paid to juvenile workers. The cost of living is again on the increase. The index number of German wholesale prices comprising 77 commodities and compiled by the *Frankfurter Zeitung* is given at 1466 at the beginning of July, compared with 1375 at the beginning of June and 100 in the middle of 1914. A further rise is believed certain in view of the further depreciation of the mark and impending taxation. The Wanderer works at Chemnitz have plenty of orders for all lines, excepting machine tools. This company ranks among the leading bicycle and typewriter manufacturing concerns. The turnover in typewriters during the past 9 months is stated to have reached nearly 100,000,000 m., and business in bicycles and motorcycles is equally brisk.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.85c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; nolished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.65
Large boiler rivets.....$2.75
Small rivets .....65, 10 and 10 per cent off list
Small machine bolts, rolled threads.70 and 7½ per cent off list
Small sizes in cut threads.....65 and 10 per cent off list
Longer and larger sizes of machine bolts, 65 and 10 per cent off list
Carriage bolts, ¾ in. x 6 in.:
Smaller and shorter, rolled threads.65 and 10 per cent off list
Cut threads .....60 and 10 per cent off list
Longer and larger sizes.....60 and 10 per cent off list
Lag bolts .....70 per cent off list
Plow bolts, Nos. 1, 2 and 3 head.....60 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜-in. x 4-in.:
Smaller and shorter.....60 and 5 per cent off list
Longer and larger sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 off list
Hot pressed nuts, tapped.....$4.25 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.60 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.25 off list
Semi-finished hex. nuts:
¼ to 9/16 in. inclusive U. S. S..80, 10 and 10 per cent off list
Same sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....4c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $42; chain rods, $42; screw stock rods, $47; rivet and bolt rods and other rods of that character, $42; high carbon rods, $50 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.85 to $3 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅜-in. and 7/16-in., $2.85 to $3 base; 5/16-in., $2.85 to $3 base. Boat and barge spikes, $3 to $3.20 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4 base per 100 lb. Tie plates, $2.50 per 100 lb.; angle bars, $2.75 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.75c. from mill. Refined bar iron, 2.50c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.30–2.55	Nos. 11 and 12	2.50–2.75
Nos. 9 and 10 (base)	2.40–2.65	Nos. 13 and 14	2.60–2.85
		Nos. 15 and 16	2.70–2.95

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.70–3.20	No. 28 (base)	3.00–3.50
Nos. 22 to 24	2.75–3.25	No. 29	3.10–3.60
Nos. 25 and 26	2.90–3.40	No. 30	3.20–3.70
No. 27	2.95–3.45		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00–3.50	Nos. 25 and 26	3.70–4.20
Nos. 12 to 14	3.10–3.60	No. 27	3.85–4.35
Nos. 15 and 16	3.25–3.75	No. 28 (base)	4.00–4.50
Nos. 17 to 21	3.40–3.90	No. 29	4.25–4.75
Nos. 22 to 24	3.55–4.05	No. 30	4.50–5.00

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80–3.30	No. 28 (base)	3.00–3.50
Nos. 17 to 21	2.85–3.35	No. 29	3.05–3.55
Nos. 22 to 24	2.90–3.40	No. 30	3.05–3.55
Nos. 25 to 27	2.95–3.45	Nos. 30½ and 31	3.10–3.65

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
July	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
20.....	12.62½	12.50	26.50	4.40	4.35	4.75	4.25
21.....	12.62½	12.50	26.75	4.40	4.35	4.70	4.20
22.....	12.50	12.37½	27.00	4.40	4.35	4.70	4.20
23.....	12.50	12.37½	....	4.40	4.35	4.70	4.20
25.....	12.50	12.25	26.50	4.40	4.35	4.75	4.25
26.....	12.50	12.25	26.00	4.40	4.35	4.75	4.25

New York

NEW YORK, July 26.

All the markets are spasmodic as to buying and in some cases quotations are difficult to define. Buying of copper is light and confined to second hands with prices lower. The tin market has been moderately active at a lower level. Lead is quiet and fairly firm. The zinc market continues stagnant with prices fairly steady.

Copper.—As the month of July draws to a close it is evident that some copper held by dealers for speculation has had to be sacrificed and this has resulted in sales of moderate quantities at price concessions which have weakened the market. Various reports are current as to the levels at which some sales of electrolytic copper have been made. An unconfirmed report is to the effect that one sale was made as low as 12.12½c., delivered, but the general level of prices at which the limited amount of sales have been made and at which further sales could be negotiated is 12.25c., New York, or 12.50c., delivered, from some of the smaller producers and dealers. The leading producers are fairly firm in maintaining quotations at 12.75c., delivered, or 12.50c., New York. Buying for foreign account is reported as fair with larger producers disinclined to sell much at present low levels. The Lake copper market is exceedingly dull at 12.50c. to 12.75c., delivered.

Tin.—About the middle of last week there was moderate activity which resulted in sales of about 500 tons of future shipment Straits tin, dealers and consumers being buyers with the former predominating. Outside of that there has been but little business since. There have been few sellers as well as few buyers, the latter being confident of lower prices, and this was justified by a sharp drop in the market yesterday and to-day, Straits tin being quoted at 26c., New York, to-day, as against 27c. to 28c. last week. London prices are also lower to-day, with spot standard quoted at £158 5s., future standard at £165 5s. and spot Straits at £158 15s. per ton, all lower than a week ago. Arrivals thus far this month have been 1270 tons with 2865 tons reported afloat.

Lead.—This market is exceedingly dull and barely steady. There is apparently enough metal at the price of the leading interest to supply the light demand and very little is heard of offerings in the outside market. We quote the market at 4.35c., St. Louis, or 4.40c., New York, for early delivery.

Zinc.—A slight improvement is reported in inquiry as well as sales this week over last week, which has been characterized by one seller as the quietest ever recorded, there having been no inquiries of any kind for three successive days. Metal which was being offered as low as 4.20c., St. Louis, last week, from one or two sources, has disappeared and the market is slightly firmer for prime Western for early delivery at 4.25c., St. Louis, or 4.75c., New York. Sales of several 100-ton lots are reported, mostly to galvanizers who have orders to fill.

Antimony.—Wholesale lots for early delivery are unchanged in a dull market at 4.65c., New York, duty paid.

Aluminum.—The quotation of the leading interest continues at 24.50c., f.o.b. plant, for virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery. Imported aluminum of the same grade is obtainable at 22c. to 23c. per lb., New York.

Old Metals.—Business is very quiet and the tone of the market is easy. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.75
Copper, heavy and wire	11.00
Copper, light and bottoms	9.00
Heavy machine composition	10.50
Brass, heavy	7.00
Brass, light	5.25
No. 1 red brass or composition turnings	8.00
No. 1 yellow rod brass turnings	5.00
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Chicago

July 27.—Copper and tin are lower in this market. Very little business is being done. We quote Lake copper at 13c., in carload lots; tin, 28c. to 28.50c.; lead, 4.35c.; spelter, 4.35c.; antimony, 7.50c. On old metals we quote copper wire, 7.50c.; crucible shapes, 7.50c.; copper clips, 7.50c.; copper bottoms, 6.50c.; red brass, 6.50c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 17.50c.; block tin, 20c., all being buying prices for less than carload lots.

St. Louis

JULY 22.—The non-ferrous markets are duller than they have been for months. Lead is quoted at 4.20c. and zinc at 4.25c., car lots. We quote Lake copper car lots at 12.98½c. to 13.23½c.; tin, 28.11c., and antimony, 5.38½c. On old metals we quote: Light brass, 4c.; heavy yellow brass, 6c.; heavy red brass, heavy copper and copper wire, 8c.; light copper, 7.50c.; pewter, 17c.; tinfoil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c.; aluminum, 9c.

Secondary Metals in 1920

Recovery of secondary copper, brass, lead, zinc, tin, antimony, aluminum and nickel during 1920 is reported by the United States Geological Survey at $188,507,260, compared with $181,841,500 in 1919. Quantities increased for nearly all items, as shown (in short tons) in the following table.

	1919	1920	Per Cent Increase
Brass scrap remelted	249,700	259,800	4.0
Other copper	112,400	130,600	16.2
Lead as metal	55,684	56,350	1.2
Lead in alloys	66,416	68,300	2.8
Zinc as metal	39,910	42,850	7.4
Zinc in alloys,* etc	6,062	7,650	26.2
Tin as metal	5,977	7,200	20.5
Tin in alloys	18,056	16,300	9.7†
Antimony as metal	48	200	..
Antimony in alloys	4,351	5,400	24.1
Aluminum as metal	6,017	5,000	16.9†
Aluminum in alloys	12,674	10,500	17.2†
Nickel as metal	163	270	65.6
Nickel in non-ferrous alloys	2,284	1,930	15.5†
Total	579,742	612,350	5.6

*Other than brass. †Decrease.

The Youngstown Metal Products Co. has been formed at Youngstown, Ohio, with a capital of $50,000 and has acquired the property on Manning Avenue and the business of the Ungar Sheet Metal Products Co. The new owners will continue the manufacture of stovepipe and will add a line of metal specialties. Samuel H. Weinreich, president, will have charge of sales and Fred S. Ullman, secretary and treasurer, will direct production. A. M. Frankle is vice-president. E. H. Hughes will continue as plant superintendent.

Plans have been completed for the second basket picnic, this year, of the National Tube Co., Pittsburgh, to be held at Kennywood Park, July 30. The program includes a baseball game, novelty events, racing, various contests and dancing and music, in addition to the usual amusements at the park. The following executive committee is in charge: William B. Schiller, Taylor Alderdice, J. H. Nicholson, Edward Worcester, P. C. Patterson, S. M. Lynch, B. C. Moise, Peter Boyd, John Fritz, J. A. Beattie, E. C. Jaycox, W. A. Cornelius and Andrew Telfer.

HOPEFUL FEELING

Youngstown Sees Signs of Improvement, but Orders Are Not Numerous

YOUNGSTOWN, OHIO, July 26.—Improved steel buying commencing with September and continuing through the fall and early winter months is predicted by a leading independent executive. Crop movement will cause the farmers to do some buying, while the railroads will begin to make needed purchases, he believes. The period between the present and the middle of September will be marked by an irregular market, it is believed. While the general tendency is undoubtedly for more activity in the industry, indicated by a somewhat marked improvement in inquiry, actual buying still lags. Recent enlargement in active productive capacity in the Valleys has been disproportionate to the inflow of new business, and is largely attributable to the working off of a backlog of tonnage. Business now being negotiated will mean fairly sizable plate, bar, angle, bolt and nut orders.

A railroad car repair contract now in course of negotiation will involve upwards of 20,000 tons of plates, for instance, though the tonnage will probably be strung out over a considerable period. District makers recently figured on an inquiry for 1000 tons of rods, but when the business was placed it was for a much smaller tonnage. The Trumbull Steel Co. is working off a substantial order for strip steel placed by the Ford Motor Co. An inquiry for 500 tons of automobile seconds in sheets elicited varied quotations, one interest offering to supply the material at 3.50c.

Turn for Better Indicated

It is generally believed that such activity prefaces a turn for the better, though some time will probably elapse before the improved tone is shown in the actual placement of business. Consumers, it is stated, are less deterred by price uncertainties than for some time past, sensing the fact that quotations are reaching bottom. A definite market is gradually being shaped ranging from $3 to $5 per ton below nominal quotations on finished products.

The problem of operating losses, arising in part from recent reductions and from the low state of operations, is an important one before producers. Owing to the recent price reductions and the low state of operations, losses are now heavier than at any time this year.

Low Prices on Sheets

The sheet market is still spasmodic. An Eastern manufacturing consumer has purchased 1500 tons of copper bearing sheets from a Valley interest at a price under going quotations. Prevailing sheet prices are 3.25c. for No. 28 black; 4.25c. for No. 28 galvanized and 2.40c. for No. 10 blue annealed. These are all concessions from the recently announced levels. It is stated that 4c. for galvanized and 3c. for black are being quoted by Eastern competitors and could probably be done under pressure in the Valleys. An important producer expresses the opinion that the market will not stabilize until prices generally reach the lower levels.

There are signs of a let-up in the full finished market and the principal district maker is preparing to curtail production, which has been steadily maintained for several months. One sheet maker is turning out material largely for the Ford Motor Co., while another, the Brier Hill Steel Co., is working off tonnage for the Dodge Bros. Co. A non-integrated interest, the Falcon Steel Co., which has been idle for several weeks, is preparing for a complete suspension to continue for possibly two months.

While somewhat more activity has been in evidence in the plate market the past two weeks, it is not of a sustaining nature. Accordingly schedules are still gaged largely on day-to-day business. The range on prices is from 1.85c. to 2c.

SALE HALTED

Government Will Not Dispose of Surplus Steel Until Inventories Are Made

WASHINGTON, July 26.—In compliance with the recent order to stop all sales of surplus property, the Shipping Board to-day rejected without opening the only bid submitted for the purchase of 110,000 tons of structural steel at Hog Island. The single tender made was by the Bethlehem Steel Co. When it was received the announcement was made that it would not be opened and no additional bids on any surplus property will be considered until the inventory of surplus property, now under way, is completed. The physical work of making the inventory is almost completed, it was stated, but only a small part of the bookkeeping done. The steel at Hog Island consists of plain, fabricated and assembled material, the greater portion being fabricated plates. The policy as to disposition of the Government surplus is to sell, following inventory, after different branches of the Government have been given an opportunity to make requisition for needed supplies, in accordance with the recent order of Director Dawes. This was made clear to-day as the result of a conference between the budget director, Assistant Secretary of War Wainwright and Colonel Hartshorn, director of sales, War Department, after which it was announced the War Department will proceed with the sale of the surplus during August which has been scheduled for disposal, other branches having made requisitions for material from these lots. Included among the lots to be sold are miscellaneous iron and steel tonnages held in different sections of the country by the Quartermaster Corps. The biggest tonnage is to be sold Aug. 15, among which is about 3500 tons of shapes.

Along with the stopping of sales of surplus stocks, with the exception menticned, the Government has held up proposed purchases. In line with this policy, the Bureau of Supplies and Accounts, Navy Department, has announced its withdrawal from market of approximately 8000 tons of plates, shapes, bars and sheets. Bids for furnishing these tonnages had been asked and were to be opened Aug. 5. The bureau also has withheld the award on approximately 900 tons of plates on which bids recently were received. These plates were to be delivered to Portsmouth Navy Yard, but it is understood the question of design of submarines is being given further study before the award is made and expected new bids will be asked later. Withdrawal of the request for bids for other steel, which was to furnish stock for six months, is attributed to the fact that stocks on hand first will be inventoried.

Freight Carried by U. S. Railroads

"Class One" railroads carried 2,249,567,625 tons of freight in the calendar year 1920. Coal and other products of the mines accounted for more than 1,200,000,000 tons, or 53.6 per cent. Grain and other agricultural products carried amounted to 220,000,000 tons, or 9.78 per cent. Lumber and other forest products carried weighed 197,000,000 tons, or 8.74 per cent. Meat and other animal products amounted to nearly 45,000,000 tons or 1.99 per cent. Manufactured and miscellaneous articles comprised 21.91 per cent, or about 493,000,000 tons. The balance—some 90,000,000 tons, or 3.98 per cent—was the total of the "less-than-carload" shipments, not classified as to character.

Federal Expenditures Drop

During the fiscal year ended June 30, United States Government ordinary expenditures amounted to $5,115,927,689, as compared with $6,403,343,841 last year. During the same period the disbursements on account of public debt fell from $17,038,039,723 to $9,182,027,170.

A Mahoning Valley fabricating interest has been figuring on 150 large boilers for the Navy Department, basing its estimate on price of plate stock considerably below the current market, at which it confidently maintains plates may be purchased.

PERSONAL

G. Grant Porter and W. Henry Twigg, managing director and director, respectively, of the Perfection Enamelling Painting Co., Ltd., London, have decided to embark in a business of representing American manufacturers in Europe. They have already made arrangements to represent some makers of machinery and equipment suitable for railroad use and shipyards, certain American devices and machines being regarded as having an attractive field of use in the railroads of Europe and in the metal-working industries. They left New York for France on Monday and have established headquarters at 11 rue de Edouard VII, Paris. They plan to cover Belgium, Germany, England and Italy. Mr. Porter has long been identified with English business activities, having first been engaged as an electrical engineer on the building of the Yerkes underground railroads of London. Mr. Twigg was for some time a consular representative of Great Britain in Venezuela.

Thomas B. Sweeney has become superintendent of the Dillon Boiler Works, Fitchburg, Mass., succeeding Joseph Scott.

W. Forster Browne, mining engineer, London, England, who has been in Canada for some time, examining properties of the British Empire Steel Corporation, also visited the United States and sailed from New York last week.

P. T. Irwin, Lincoln Twist Drill Co., Taunton, Mass., has been made sales manager, drill and reamer division, Greenfield Tap & Die Corporation, Greenfield, Mass., with headquarters in Greenfield. Galen Snow has been made advertising manager.

H. F. Randall, former manager of the New York office of the G. H. Williams Co., Erie, Pa., has succeeded E. F. Jones as general manager, Mr. Jones having resigned.

R. D. Love has been made manager of sales of the Warren Iron & Steel Co., Warren, Ohio, with headquarters at Warren, Ohio. He was formerly manager of sales and buyer for the Betz-Pierce Co., Cleveland, and later was connected with the sales department of the United Alloy Steel Corporation, Canton, Ohio.

A. C. Anderson, mechanical engineer Putnam Machine Works, of Manning, Maxwell & Moore, Fitchburg, Mass., is now engaged in engineering work for the William A. Hardy & Son Co., 133 Water Street, Fitchburg, brass founder.

David E. Roberts, consulting engineer, Cardiff, Wales, who has spent some months in China in connection with the proposed construction of additional iron blast furnaces, sailed from New York for England this week. Mr. Roberts has made a number of trips to the United States in recent years, visiting leading iron and steel plants.

Edgar L. Keithley, recently with the Seattle Plumbing Supply Co., has established an office at 1323 Alaska Building, Seattle, Wash., as a representative of the Central Foundry Co., maker of cast iron pipe, soil pipe and general castings. He will assist his father, E. A. Keithley, the company's representative at San Francisco, and will cover Oregon, Washington, neighboring States and British Columbia.

John D. Hurley, president Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, sailed from New York on the Olympic July 16 for an extended trip on business and pleasure throughout continental Europe. He was accompanied by Mrs. Hurley.

E. W. Crellin, former president Pittsburgh-Des Moines Co., has retired from active duty. The following officers have been elected: W. H. Jackson, president; O. E. Guibert, vice-president; George A. Smith, secretary and treasurer; W. W. Hendrix, vice-president. Mr. Smith has removed from Des Moines to Pittsburgh. A. C. Pearsall has been appointed general manager of the Des Moines branch.

J. C. Davies, managing director of Baldwins, Ltd., Swansea, Wales, who has spent some weeks in Canada at the plants of his company, sailed from New York on Tuesday.

Robert Wilson has resigned as superintendent of the Fabricated Steel Products Co., Leetonia, Ohio, to become identified in an official capacity with the Adams Mfg. Co., East Palestine, Ohio.

F. A. Hastings has been appointed assistant sales manager of the Pittsburgh Bridge & Iron Works, Pittsburgh. He has been with the American Bridge Co., and formerly of Wheeling, W. Va.

W. R. Hartline, for the last two years in the refinery construction department of the Texas Co., Houston and New York, has been added to the sale department of the Traffic Motor Truck Corporation, St. Louis, to assist in the promotion of sales to contractors and engineers. He was a flying engineer officer in the Army air service during the war. He is a junior member American Society of Civil Engineers.

President Lloyd Booth of the Falcon Steel Co., Niles, Ohio, announces that W. T. Brangham, assistant general sales manager, will have charge of the sales department during the next few months, under executive direction, due to the resignation of George E. Harris as general manager of sales. Mr. Harris has resigned to engage in business for himself in Detroit.

William J. Todhunter, for almost 35 years with the Illinois Steel Co. at South Chicago, Ill., has resigned as superintendent of the slab and plate mills at South Works to become manager of the American Forge Co., Chicago, a subsidiary of the Ajax Forge Co. Charles Horn, who has been assistant to Mr. Todhunter, succeeds him.

Paul C. Bandy, who formerly handled the sales work in the industrial heating department of the Cutler-Hammer Mfg. Co. in the Western district, is now manager of the industrial heating department of the Russell Electric Co., Chicago, who recently entered the industrial heating field in an extensive way.

George D. McDougall, general superintendent of the Nova Scotia Steel & Coal Co., New Glasgow, N. S., has been appointed chief engineer of the British Empire Steel Corporation, and Archie McColl, for many years secretary of the former company and assistant to the president, will be general manager of the Nova Scotia Steel & Coal Co., according to official announcement made by D. H. McDougall, vice-president of the British Empire Steel Corporation.

Clement C. Smith, Milwaukee, has succeeded Holden A. Evans as president of the Baltimore Dry Docks & Shipbuilding Co., Baltimore. He was chairman of the board and will continue to serve in that capacity. Mr. Evans also will serve on the board.

E. C. Welborn, 29 South La Salle Street, Chicago, has opened offices as business and engineering counsel in the solution of financial, business and engineering problems. Mr. Welborn graduated from Indiana University in 1897 and from the mechanical engineering course at Cornell University in 1903. He has been identified with the Illinois Steel Co., the Allis-Chalmers Mfg. Co., the Standard Separator Co., and for the past two years has been vice-president of the Hanna Engineering Works, Chicago, in charge of engineering, development, manufacturing and sales.

H. M. Salisbury, export manager Maxwell Motor Sales Corporation, Detroit, has gone to Europe to study conditions in England, France and Holland.

Charles S. Newmann, assistant secretary Union Mfg. Co., New Britain, Conn., will sail for home from Southampton, England, Aug. 3, following a three months trip.

Stewart C. Wilson has been appointed Pittsburgh district sales manager of the Whiting Corporation, Harvey, Ill., succeeding Robert S. Hammond, recently transferred to Chicago.

OBITUARY

James W. Porch

JAMES W. PORCH, for 23 years sales manager at New Orleans for the Lukens Steel Co., Coatesville, Pa., died July 21 after an operation. He was 63 years of age. Speaking of him, the New Orleans *Times-Picayune* of July 22 said: "Mr. Porch, from the day he came to New Orleans 23 years ago, was one of the city's outstanding personalities. Aggressive, a keen student of affairs, he took a leading part in virtually every movement launched in the last 20 years looking toward the development of New Orleans as a great port and a commercial center. He was a waterways enthusiast, one of the first of the little group of men who fought for revival of river traffic and who finally watched their following grow with the result the Government actually undertook that revival with its barge lines on the Mississippi and Warrior rivers. Another of his activities which was perhaps best known was his connection with the Public Belt. He was one of the first advocates of this city-owned facility and one of the most able campaigners in making it a reality."

Before going to New Orleans, Mr. Porch, under the Cleveland Administration, was the American consul general at Mexico City for a number of years. He is survived by his wife and two married daughters.

AUGUST C. KIECKHEFER, founder and former president Kieckhefer Elevator Co., Milwaukee, a manufacturer of freight and passenger elevators, died suddenly of heart disease in the Northwestern Station at Chicago on July 20 while waiting for a train to Milwaukee. He was 67 years of age and a native of Milwaukee.

BERNARD H. WENZEL, secretary Jaeschke Bros. Foundry Co., Milwaukee, died July 19 following a long illness. He was 29 years of age.

FRANK P. STANLEY, head of the Stanley Mfg. Co. and the Stanley Marine Engineering Co., died at his home on Puritan Lane, Swampscott, Mass., July 18, following an attack of heart disease, at the age of 71.

JONATHAN E. PORTER, founder of the Porter Machine Works, Hatfield, Mass., lathes, died of heart trouble at his summer home at Crescent Beach, Conn., July 21, at the age of 72. He was born at Hatfield, Nov. 22, 1849.

Federated Employment Bureau of the Engineering Societies

The Federated American Engineering Societies has taken over as part of its work the employment bureau for engineers which the national engineering societies had maintained for some time at 29 West Thirty-ninth Street, New York. Representing a combined membership of about 50,000, the Federated Engineering Societies plans to make this clearing house of engineering service increasingly valuable to employers and to engineers of every variety of training and experience. It is required that applicants be members and that they submit complete educational and professional records. The records are carefully classified and as the special requirements of any position are received the equipment and experience of men of suitable qualifications are submitted for consideration. The services of the bureau are free to employers and members alike. Since the arrangement was made for this joint conduct of the employment work of the various engineering societies the effectiveness of the service has been increased to a marked degree.

Cast Iron Pipe for Milwaukee

MILWAUKEE, WIS., July 26.—The city of Milwaukee closes bids Aug. 10 on 3510 tons of 54-in. cast-iron pipe and 343 tons of 54-in. special castings, f.o.b. Milwaukee, for delivery in 45 days.

DISSATISFIED WORKERS

Youngstown Employees Object to Wage Cuts—Many Preparing to Go Elsewhere

YOUNGSTOWN, OHIO, July 26.—While workers in the iron and steel industry are glad to secure employment, in the majority of cases, at almost any wage, the most recent wage reduction by independent producers, effective July 16, has caused considerable dissatisfaction. As a consequence of the moderate wage rate, many employees are preparing to seek work elsewhere or in other lines when business conditions are righted.

Wages earned by many men are a third or a half of their earning capacity during the war and they contend that living costs have not been proportionately reduced. Irregular employment, furthermore, has still further curtailed their income, with the result that socialistic and bolshevik tendencies are evident. Mill men state that radical sentiments are cordially received by many workers, owing to their dissatisfaction with current conditions.

Many men who were attracted to the mills by high wages during the war have either left the industry or are preparing to do so. In some departments of the industry, men have worked steadily less than a month during the past eight months. One sheet mill roller has worked 63 days this year, while there are many others who have worked less.

Generally the men feel that operating economies should not be compelled to bear the brunt of the readjustment, but that the executive and sales departments should be proportionately scaled. While salaried men have been cut an average of approximately 10 per cent and in some cases 15 per cent, workers in the mills claim such reductions have not equaled the cuts for operatives.

New Pittsburgh Scale

A break in the Pittsburgh building trades tie-up which has existed since June 1, because of the failure of the contractors and unions to agree on wage scales, is indicated by the action of the bricklayers' union recently in adopting a new scale reducing the rate from $12 per day of eight hours to $10.40, and cutting the overtime charge from double time to time and a half, except on Saturday afternoons, Sundays and holidays. There are no indications that this offer will be accepted by the contractors, who some time ago offered to sign an agreement with the unions calling for $1.12½ per hour or $9 a day of eight hours, and are not disposed to raise the offer. It is encouraging to those hoping for an early settlement of the building trades dispute that the bricklayers are showing signs of a desire to get to work. Meanwhile, union bricklayers on strike in Pittsburgh are said to be working in places just outside Pittsburgh as low as 80c. an hour and drawing strike benefits from the Pittsburgh union.

Unemployment Increasing

Unemployment still is increasing in most districts of Pennsylvania, according to the latest report of the State Bureau of Labor and Industry, covering the situation as of July 15. In the Altoona district there was a decrease from 22,050 on July 1, to 20,850 on July 15, the explanation being found in the resumption in the Pennsylvania railroad car shops in that district. Unemployed in the Pittsburgh district on July 15 numbered 50,850 as compared with 48,100 two weeks before. In the Erie district, 14,775 were idle against 14,635 on July 1. Harrisburg reports 20,850 out of work on July 15, against 14,245 on July 1; Johnstown 19,290, against 17,090; McKeesport 5890, against 5850; New Kensington 10,250, against 9820; Philadelphia 116,000 men and 11,550 women, against 105,000 and 11,150, respectively; Scranton 15,375, against 20,250, and Williamsport 6650, against 5950.

BOOK REVIEWS

Protection Our Proper Permanent Policy. By James T. McCleary. Pages 544. 5¾ x 9 in. Published by the National Tariff Institute, Inc., Washington and St. Paul.

Mr. McCleary is well known to the iron and steel trades for his successful administration of the affairs of the American Iron and Steel Institute for a number of years preceding 1920. He was representative in Congress from a Minnesota district for a series of terms and was assistant postmaster general under the Roosevelt administration. In all his public speaking, covering many campaigns, he brought to the discussion of national questions an unusual candor, clearness and teaching power. His method is the method of an honest instructor, who in arguing a proposition seeks, without any of the mere fencing of a contender, to lodge his thoughts in the minds of his readers or hearers, in just the way in which they were formed in his own mind. The art of doing this is rare.

Mr. McCleary is a protectionist, there is no doubt about that—a protectionist of the school of James M. Swank and "Pig Iron" Kelley. Not many of that type are to be found. Mr. McCleary's view is that protective tariff rates cannot be too high. In the chapter on "What Shall Be the Rates of Duty?" he writes:

"When we remember that under a protective tariff the duty is not a tax on our own consumers but a license fee on the foreign producers (and it is vital that every American citizen get this clearly established in his mind), all fear of getting the duties too high will disappear; and it will become the more evident the more clearly the subject is understood, that the only mistake possible is that of getting the rates of duty too low."

If that be the protectionist's confession of faith, it will have to be said that a good many among the present generation of American business men are apostate. The more one knows of the amount of practical politics entering into a tariff bill, the less reverence he has for protection as expressed in actual legislation, sound as he may consider himself to be in the faith as delivered to the fathers of a protective tariff. In connection with the Fordney bill that passed the House with so little consideration nothing has been plainer than that the sentiment of the business men of the country, without regard to party, favored moderate rates—more moderate than those decided on by the Ways and Means Committee. Foreign countries on whose products high duties are levied at American ports are led to discriminate against American products, and sentiment has grown among our exporting manufacturers in favor of a bargaining tariff.

Mr. McCleary has presented clearly and fairly, and withal most interestingly, the history of tariff legislation in the United States. He takes issue not only with the tariff reform and "revenue only" doctrines that now and then have carried a Congressional election, but combats what he considers heresy in some of the tariff views that have had a following in his own party, referring particularly to the declaration in its platform of 1892 that the duties levied should be "equal to the difference between wages abroad and at home." He objects to this on the grounds that the difference between foreign and domestic wages cannot be definitely learned, that rates so adjusted could not continue a proper measure of wage differences, because of changes, and in any event such an adjustment would not be properly protective. The book is a consistent preachment of Simon-pure protection, unmodified by any of the latter-day developments in our foreign trade. It illustrates how far apart men can be on this matter of the proper fiscal and impost policy of the American Government, yet with each side confident that its view will insure the largest prosperity to the largest number.

It can hardly be said that the liberal quotations from newspaper editorials and addresses of public men which intersperse the various chapters have added strength to the book. Mr. McCleary has done his work so well that these quotations are rather dilutions. But evidently the thought was to make these sidelights on American economics and business contribute to the author's purpose to prepare a complete handbook of protection. Enthusiasm in the cause is written on every chapter, and the reader will not miss the purpose to give protection as a national policy a standing with the present generation of American business men such as it had for 30 years following the Civil War. Mr. McCleary's long public service and his years of study of the tariff equip him in an unusual way to write a textbook of protection, and even the reader who may not agree with him will not withhold admiration of the stalwartism of his defense of the faith.

Armco in Picture and Fact, a book of 247 pages, traces the history of Armco ingot iron from the mines of the Lake Superior district through the blast furnace, the open-hearth furnace, the soaking pit and the blooming and bar mills to the sheet mill, where it takes its final shape. Then the processes of annealing, pickling, galvanizing and cold rolling are described, with the various auxiliary leveling, resquaring and inspection. Specialties are outlined, together with the methods of their manufacture. About 85 pages in the rear of the book are devoted to tables designed to aid the user of sheets. It is published by the American Rolling Mill Co., Middletown, Ohio.

Facts and Figures of the Automobile Industry, published by the National Automobile Chamber of Commerce, 366 Madison Avenue, New York, records in its 96 pages the volume of the automobile industry in production during 1920, with comparative figures for earlier years; the distribution of cars by states and by countries external to the United States; the exports and imports of cars, both pleasure and truck. It gives figures of the consumption of fuel, production of rubber, and number of dealers and service stations. It shows the steady increase of cars in the United States, from 2,445,664 in 1915 to 9,211,295 in 1920, and lists 8,369,605 of the latter as passenger cars. Of the world registration of 10,922,278 cars, 83 per cent are in the United States. Extracts from State laws show annual fees and general requirements.

Greenfield, Mass., manufacturing interests have established an attractive permanent exhibition of their products in a large room leading out of the sun parlor, Weldon Hotel, that city. Among those concerns having exhibits are: the Greenfield Tap & Die Corporation, taps, dies, drills and other small tools, as well as machine tools; Ruggs Mfg. Co., lawn, hand and hay rakes and wood and steel snow shovels; Velco Mfg. Co., broaching machines and broaches; Greenfield Machine Co. Division, Greenfield Tap & Die Corporation, a No. 1 external grinding machine; Russell Mfg. Co., screw plates with double reversible dies; Production Machine Co., a type R utility grinding and polishing machine, and Goodell-Pratt Co., small tool display. It was through the efforts of F. O. Wells that the exhibit was made possible.

According to a cablegram from Commercial Attache C. H. Cunningham, Madrid, a decree published July 19 makes the duties specified in the new Spanish customs on coal and coke effective at once. These duties had been suspended since 1915. The duties levied in the new tariff are as follows: Coal, 7.50 pesetas per 100 kilos, and coke and briquets, 9 pesetas per 100 kilos. (Peseta, normal value, 19.3c.; 100 kilos, 220.46 pounds.)

The conference between the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers reconvened July 25 at Chicago, to negotiate a new wage agreement. The conference was adjourned in June at Atlantic City following failure to agree after a week's negotiation. Manufacturers demand a practical return to the 1915-16 scale, which would amount to a reduction of $1.87 per ton for boilers on the base paid at present.

Explosion Hazard and Its Prevention

(*Continued from page* 206)

In coal mines the most used correctives are among others; (a) the use of water to moisten the dust and counteract its floatibility in the air, by the use of sprinklers or chemicals such as deliquescent salt (calcium chloride); (b) the localization of the danger by dividing the mine into safety zones separated by positive barriers to conflagrations. For that purpose stone dust has been used, as tests have proved that any flame could be stopped by a shower of fine mineral dust of a certain magnitude; (c) the prohibition of certain explosives, and the use of explosives that generate only low temperatures, and that fail to ignite existing coal dust mixtures (safe explosives); (d) the prescription of safety lamps that do not propagate their flames; (e) good aeration to assure only very lean mixtures. The question of coal mines is very complicated and somewhat outside of the industrial field. The writer has no pretension of being complete. This summary merely outlines what has been done, and is full of suggestions.

Pulverized Fuel Applications

Of all other applications of coal dust, the pulverized fuel plants are the most important, because they are built to produce on a large scale coal dust of impalpable fineness in dry form. That poses the questions: Are there any coal dust-air mixtures used in pulverized fuel plants? And how far is their operation safeguarded?

In the milling plants, before the fuel reaches the pulverizers, it is in such coarse form that really no explosion danger exists. After it has been pulverized there are three distinct operations creating coal dust-air mixtures: (1) the screening operation (2) the pneumatic distributors (3) the burners.

All pulverizers work in connection with a sifting device whose object it is to maintain a certain degree of fineness of the product delivered. These contrivances may be based on mechanical principles and use sieves, or may use air currents of various velocities and changing directions. Both devices create fuel-dust-air mixtures that are practically safe. Air separation mills use a cloud density of 1 lb. of coal powder to 30 to 60 cu. ft. of air. Their circuit is short, always below 100 yd., including return lines, which correspond to a great localization. They never handle more than 5 lb. of coal per sec. in one unit. Their pipe lines are usually very much inclined and never should be less than 60 deg. from horizontal to avoid deposits of any dust in the lines in case of unforeseen shutdown of the fan. The velocities of the air currents in the pipe lines are above 4000 ft. per min.

The only weak point is the cyclone separator, where possibility for unfavorable safety conditions exists because of the low velocities that have to prevail there for functional reasons. Thus the danger, if any, is localized in one particular point that should be placed outside of the buildings and be provided with suitable safety valves to relieve possible pressures. In that manner all trouble inside the building is avoided. Furthermore, as hardly any chances for ignition exist, reasonably safe conditions are assured, which is proved practically by the high reputation and the increasing popularity of this method of separation in all industries.

Pneumatic distributing devices also create, purposely, fuel-powder mixtures with air. They are divided into two classes, according to their principle of operation. The emulsion type uses a mixture less than 3 cu. ft. of air per lb. of coal, according to the various features of the systems developed. They are practically explosion-proof, as their dust concentration is extremely high, and in their complete circuit no contact with any fire or outside source of ignition exists.

Suspension methods of distributing fuel powder use cloud densities varying from 40 to 120 cu. ft. per lb. of coal transported, according to the distance of distribution and the varying conditions in the operation of the system. These cloud densities approach often, and sometimes are beyond, the high limit of inflammability. To counteract this shortcoming, and also to reduce pipe diameters and avoid deposits, great current velocities are used. Speeds varying from 3000 to 6000 ft. per minute are common.

This corrective should exist in the complete circuit; whenever cyclones are used they should be placed under all circumstances outside of all buildings, without unnecessary connections to any other part of the equipment, in order to isolate the danger point as much as possible. Explosion relief valves are absolutely necessary to prevent the building up of any pressures, as well as safety back pressure devices segregating part of the lines. The suspension system of distribution can be made reasonably safe for short distances, where densities of 40 to 70 cu. ft. per lb. of coal might suffice to maintain the flotation of the dust; beyond those limits its safety becomes precarious, especially because, in their actual commercial forms, direct connection to furnaces exists.

The third point in using mixtures of fuel dust and air concerns the burners of the furnaces or boilers. The mixtures may be the primary air-fuel dust in the ratio of 1 lb. of coal to 20 cu. ft. or less of air, for distances up to 100 ft., or secondary (volume) air and fuel in the ratios of 1 lb. of coal to 150 or 200 cu. ft. of air, depending on the nature of the flame wanted. The first mixture is only a means to transport the coal powder from the bins to the furnaces, and the second mixture is produced in those very dangerous proportions for immediate combustion purposes. The ignition is wanted continuously, and the temperature in the combustion chamber is raised very high with that aim in view. To be safe, burners must first confine the combustion to the combustion chamber, which is easily done by maintaining the flow velocities in the burner pipes higher than the flame velocities of fuel-air mixture at the high temperatures, and by having their air and fuel dust supply interlocked and under instant control of the operators.

In designing various machines and devices along the lines developed above, or in incorporating minor changes suggested, there is no doubt that, with proper engineering skill, the various pieces of apparatus making up powdered coal installations can be made safe to a point of practical exclusion of any explosion hazard.

Ignition and Self-Ignition

The one problem that remains to be discussed is the cause of ignition. Just as an explosive is relatively harmless without a detonator, a dust-air mixture is not absolutely dangerous by its mere existence. An ignition source is necessary to produce an explosion. These sources, which may be external or internal, must be carefully avoided, to assure safe conditions.

All outside fires, like Bunsen burners, open flames, torches, connections to furnaces, should be prohibited in the close neighborhood of any inflammable mixture. The use of electricity should be preferred anywhere, with the obvious precaution that sparks should be prevented by the choice of proper motors and current characteristics, a.c. versus d.c., by the use of correct wiring to avoid all chance of short circuits, by the installation of properly protected lights (no arc lamps allowed) and by the use of properly grounded neutral connections that counteract stray-currents, as well as electro static or electro dynamic tensions. Electricity, besides being the most convenient prime mover, permits with the simplest means compliance with these logical prescriptions, and presents the added advantage of permitting easy interlocking of all drives for greater mechanical safety.

The internal source of combustion with fuels is usually called self-ignition. This phenomenon, known to all interested, exists with storage of coal independent from its physical form, be it run of mine or crushed or pulverized. As coals are heterogeneous materials, soiled with all kinds of impurities, there should be nothing mysterious about self-ignition in the light of the above technical reasoning. It is merely a slow oxidation effect, starting perhaps with a pyrite impurity, and causing a local rise in temperature. The phenomenon may die out or propagate, according to circumstances. If the coal is rich in hydrocarbons, this

increase in temperature may distillate some low volatile gases liable to create dangerous mixtures with air. With finely pulverized fuels, the chances for these reactions are increased by reason of the large surfaces of contact and the ease of distillation of some hydrocarbons out of small particles of coal. This slow burning of stored coal is accompanied by a penetrating odor, and often by the formation of smoke, that make it easily noticeable.

Remedies against self-ignition are:

1. Store the coal preferably in the raw or crushed form, and dry and pulverize it only according to the needs of operation of the plant.
2. The storage capacity of dried and pulverized coal should be such as to avoid all danger from self-ignition.
3. Pulverized fuel should be stored preferably in close proximity to its place of combustion.

The first rule, besides being a safety recommendation, is the expression of the sound manufacturing principle: Ample storage of raw material and progressive transformation. The size of bins for storage of dried and pulverized coal is essentially dependent upon the coal quality and the time involved. No general rule will apply, and to prescribe maximum time and maximum storage capacity would be unfair to certain coals. The best suggestion is a time test of each coal quality. By duplicating practical operating conditions, this question can be settled without guess and interference of side issues. The coal bins located next to furnaces can easily be emptied by burning up their content without danger.

For raw coal, aeration has proved a reliable antidote against self-ignition, because air currents cool down the coal and retard the oxidation effect, and accumulations of gases in quantities are avoided.

Besides the pulverized coal itself, existing only inside of the various machines, bins and handling devices, it is necessary to consider also the so-called mill-dust which, in the course of time, accumulates everywhere in any industrial building—on roof trusses, in corners, on top of flat surfaces. This mill dust is often of inflammable nature and its accumulations are a constant source of danger. The removal of mill dust is an absolute operating necessity from the safety standpoint, and cleanliness is not only a hygienic virtue but a preventive, whose importance cannot be emphasized enough. The most economical method of dust removal is the well-known vacuum dust-collecting system, that incidentally permit a complete recovery of the dust, often of commercial value.

These vacuum devices should be in every factory, and no pulverized fuel plant should be without them. Of the various systems offered by the trade, those are to be preferred where the exhaust fan is located beyond the point of collection, on account of their superior efficiency and safety.

Understanding Essential to Progress

Prejudice and ignorance are some of the greatest enemies of progress. Only by frank, unbiased study and diligent research will antiquated opinions be shattered and real knowledge diffused. As industrial safety is a corner stone of prosperity, a better understanding of the nature of explosions, their hazards and their remedies will be essential to further industrial welfare. The writer hopes that this analysis will contribute to that end.

Causes and Occurrence of Dust Explosions*

Static Electricity an Important Contributory Cause but Dust Proportion the Vital Element

RECENTLY the engineers of the Department of Agriculture were asked to investigate an explosion of rubber dust occurring in the recovery of hard rubber. That was a new form of explosion. It cost the lives of nine men and indicated that certain by-products in certain industries are now being utilized, in which very fine dust is produced. That may account or some of the explosions that have taken place in some industries that we have not hitherto regarded as dangerous.

We might cite an example of that in the cereal industry, where in recent years the oat hull has been utilized and is now being ground for the manufacture of cattle feed. That by-product some years ago was more or less waste; and in other industries we may explain the frequency of explosions by the utilization of by-products that were, not many years ago, considered as waste. In the grinding or manufacturing process very fine dust is, therefore, created and the explosion follows.

The theory of dust explosions should not be difficult to understand because, upon analysis, it is very simple. It has been found in tests that the finer and the drier the dust, the more explosive its condition. This is quite natural, because the finer the dust, the nearer its molecules approach the size of gas molecules, and what occurs in a gas explosion is very similar in form to what occurs in the dust explosion, in fact, almost identical.

Dust "Explosions" Simply Rapid Combustion

Dust does not explode, of course, like dynamite. It is simply a rapid propagation of flame. Just what occurs when the explosion takes place is somewhat debated at present. Some physical chemists claim that the dust, upon being heated, distills explosive gases; others state that that is not the case, but that the combustion is so rapid that the rapid rate of flame travel creates a tremendous pressure and the explosion follows.

In the industrial plant one explosion, only, rarely takes place—there are usually two and in some instances three. That has been explained in this way: the original dust explosion might be just the ignition of small quantities of dust and air, which produces sufficient concussion to jar or shake into the air any dust lodged on girders, beams or ledges in any part of the plant. This dust feeds and propagates the flame from the primary explosion, resulting in the secondary or vital explosion, which is the one that usually causes the extensive damage.

Static Electricity Causes Explosions

The Department has been asked in recent years to look into many interesting cases of explosions, not only in industrial plants, but in the operation of farm machinery. One particular problem between the Cascades and the Rockies, in the Pacific Northwest, has shown that in some seasons as many as 600 explosions have occurred in five weeks' time in the threshing of wheat in the vicinity of Spokane, Wash. Although at first the operations of the I.W.W. were assigned as the cause of the explosions, investigation showed scientific developments. The wheat in the territory was diseased with smut dust that was very explosive, and the remarkable part of the investigation was that the machines operating in the field generated a large static electric voltage.

Engineers have tried to measure that discharge, and in some cases it runs as high as 52,000 volts, although it is, of course, at very low amperage. But it made a very hot spark, and the passing of the spark from the cylinder teeth to the concaves in the threshing machine ignited the dust. Of course, the thresher operator laughed at the idea at first that he was generating enough electricity with his machine to burn

*Abstract of paper read before Cleveland section of Associcharge grain dust explosion investigations, United States Department of Agriculture, Bureau of Chemistry, before the Western Society of Engineers.

him up or blow him up, but nevertheless the scientific investigations disclosed that to be the fact, and the wiring of those machines has controlled the frequency of the explosions.

A year or two later the Department was asked to look into a series of frequent fires in cotton gins in the South. This happened during the war, in 1917, and of course they were all "pro-German cases," in which matches were being introduced with the cotton, supposedly. But an investigation disclosed that the fires were very similar to the cases in the Pacific Northwest. The friction of the cotton on the galvanized pipe, in passing from the wagon to the gin, built up the charge which ignited the cotton. This led to a grounding arrangement which materially reduced the fires.

Explosion Lessons Result in Reforms

All the way down the line we find that explosions are occurring in representative lines of industry, and in the operation of certain machines or equipment where these conditions exist or the dust is present. The explosion that occurred in Minneapolis, May 2, 1878, when the Washburn-Crosby Mills blew up, led to the introduction of improved types of dust collecting equipment.

Professors Peck and Peckham, then called upon by the coroner to investigate the cause of this explosion, constructed a box containing about 2 cu. ft. of air space and by blowing 2 oz. of flour dust onto a Bunsen burner inside the box they were able to lift two men standing on the box lid. That 2 oz. of flour dust, when ignited, would raise the weight of 300 lb. A physical chemist, with the chemical composition of flour known, has taken that calculation and found that, if it were possible to release a sack of flour, and diffuse it at that ratio, on the basis of that experiment, that one sack of flour would l'fe 2500 tons 100 ft. high.

Coal Dust Highly Explosive

In another investigation the Bureau of Mines finds that 0.02 ounce of coal dust per cu. ft. of air space is sufficient to produce an explosive mixture. The explosive range of methane gas is from 5½ to 14 per cent. That means that with methane having less than 5½ per cent there is no explosion; with over 14 per cent there is too much gas present, but the range is between those two extremes. With 0.02 ounce of coal dust per cu. ft. of air space there is a mixture that could produce an explosion. That is taken as a standard, because we have made coal dust the standard in the tests, but grain dusts are more explosive, so it would probably take less grain dust than it would coal dust.

Figures are usually monotonous and uninteresting, but they will give some idea of the tremendous pressures created when explosions of this kind occur. On the basis of 0.02 ounce per cu. ft., only 80 ounces would be needed in a room 20x20x10 ft.; 5 lb. of dust diffused in proper proportions through the air in a room of that size would be sufficient to blow it apart.

In the laboratory experiments, by using 75 milligrams (1/380 ounce) of dust, just a small quantity, in a little vessel of 1400 cu. cm. capacity (88 cu. in., equivalent to 4x4x5½ in.) we have produced as high as 20 lb. pressure per sq. in. These figures show the terrific explosive force contained in dusts when mixed with the right proportions of air and subject to conditions that are favorable to explosion.

Summarized in Three Conclusions

First there are certain engineering problems that must be solved before we can expect to control or prevent these dust explosions. Recent cases that have occurred have taken place in the most modern, well-constructed and well-equipped plants. It has been demonstrated that a so-called "fire-proof" plant, a plant built of fire resistive materials, by no means is explosion-proof. If it is well constructed, it must be well maintained. Construction engineers must recognize the hazard and danger of dust explosions, and not permit any opportunity for the accumulation of dust in any manner whatsoever, because an accumulation of dust, when forced into supervision, will naturally permit the propagation of the flame from the primary explosion.

Second is the progress recently made in determining that electrical sources are largely responsible in many cases for disastrous explosions. A recent case in the Southwest indicated that the breaking of an incandescent lamp bulb by a workman carrying something on his shoulder ignited the dust and caused an explosion. That point was not accepted by the electrical engineers at the time, on the basis that breaking the bulb destroys the filament and thereby removes the possible source of ignition.

But the Bureau of Chemistry took up the matter with the manufacturers of electric lamps and conducted a series of co-operative experiments at the Nela Park laboratory of the National Lamp Works, Cleveland. These tests established definitely that there is not a type of electric lamp made but that, when the bulb is broken, will produce dust explosions immediately, if there is the proper proportion of dust in the air. That introduced a new element of danger, in that the use of electric bulbs in dusty atmospheres is unsafe. They must have vapor-proof coverings; a mere wire guard is not sufficient. Upon introduction of a lamp into a bin or a dusty part of the plant, if the bulb is broken, the explosion follows immediately.

It also developed in that investigation that the dust settling on the lamp globe may result in fires. Certain kinds of dust reach the point of incandescence and fire follows. If the dust particles that have been set afire drop onto the floor fire ensues, or if they drop through the air in which the dust is suspended in proper proportion the explosion will follow.

That simply means that we have got to recognize what we consider the advanced lighting methods in our industrial plants as affording a possible cause of dust explosions. We must take the necessary steps to control the static electric conditions that produce sparks in certain types of milling machines, and which will ignite dust, beyond question.

The third important matter is a subject for very grave discussion which will have to be decided in this country and Canada very soon, before we can attempt to make progress on control of dust explosions. The flour milling industry has made progress in explosion prevention by introducing improved types of dust collecting systems. It is rather difficult now to do that in a grain elevator, but I do not believe we are ever going to prevent explosions in grain elevators until we come in some way to a system for collecting the dust.

The possibility of suction or aspiration on the grain from the time it enters the elevator until it leaves should be looked into—in other words, we might put an application of suction at every point where the grain is thrown or handled. That cannot be done in any large terminal elevator now, because the possible difference of weights between the shipper and the receiver prevents. But if they were handling a material that had gasoline or dynamite or something else like that in it, they would take it out, probably very quickly.

Pulverized Coal Dangerous

Investigations of the United States Bureau of Mines have given rise to the following notes:

A small stream of pulverized coal leaking down from a defective joint in a coal transport line does not attract much attention, whereas a leak in a natural gas line under similar circumstances receives immediate attention. As a matter of fact, if by any means the dust cloud should come in contact with an open flame or hot metal, the effects would be as disastrous as if it had been gas.

One of the most serious troubles with which users of pulverized coal have had to contend has been the number of fires in the storage bins for pulverized coal. It has been somewhat difficult to determine the exact cause of these fires, but undoubtedly spontaneous combustion has played an important part in the origin of some of them.

Care should be taken that pulverized coal is not

delivered to storage bins at a high temperature; and to avoid this, the gases of combustion from the drier furnace should not be allowed to become hot enough to overheat the coal. Storage bins for pulverized coal should not be placed in any position where they may become heated from furnaces, steam pipes, or hot flues.

If a plant has been shut down for several days, delivery of coal from the storage bin through transport lines to the place of consumption should not be permitted before an examination is made to ascertain whether the coal has become heated to such a point that it will ignite when brought in contact with a current or blast of air.

The Drying of Pulverized Coal*

One of the biggest and most expensive pieces of machinery in the preparation plant is the drier. In the past it has been considered necessary to dry the coal down to 1 or 2 per cent of moisture in order properly to pulverize, feed and burn it. Latest practice indicates that it is not necessary to have the coal anywhere near this low percentage of moisture, and in some cases it is possible to operate without using driers, and to design and install the plant without them. The Allegheny Steel Co. has operated for three years without driers, and the new Ford Motor Co. installation has been built without them.

There is no doubt, also that progress will be made in perfecting the driers, where they are used, so as to reduce the cost of installation and operation. There is, in addition, a strong possibility of development so as to dry the coal either in steam driers or by the utilization of waste gases, where drying is deemed necessary.

The net over-all efficiency is about the same, whether the moisture is taken out of the coal by predrying or evaporated from the coal in the boiler furnace. There is, if anything, a slight advantage in favor of the latter.

*Abstracted from a paper by Loren L. Hebberd before the Technical Association of the Pulp and Paper Industry.

Bids on Surplus Material

WASHINGTON, July 26.—A price of $9.37 per gross ton for cast iron pipe and 8 1/3c. per lb. for copper was received by the Ordnance Salvage Board, War Department, for approximately 2527 gross tons of surplus pipe and 127,075 lb. of surplus copper rotating bands in the form of cast iron proof projectiles, with copper rotating bands assembled on them, the Bridgeport Iron & Metal Co., Bridgeport, Conn., being the purchaser. Aside from this company, the bidders were: E. J. Ellis, Washington; National Metals Co., New York; Boston Iron & Metal Co., Baltimore; Hyman-Michaels, Chicago; Max Solomon, Pittsburgh, and Briggs & Turivas, Chicago. The sale was announced last Wednesday.

Elevator Company to Have New Plant

The Graves Elevator Co., Inc., 426 Exchange Street, Rochester, N. Y., has increased its capital stock from $30,000 to $250,000 to raise funds to purchase a site and erect a new building. The site chosen is in Lincoln Park, across from the General Railway Signal Co.'s works and adjacent to the new plant of the Rochester Casting Co. Loren O. Graves, president Graves Elevator Co., is secretary of the Rochester Casting Co., which will furnish the elevator company with castings. Plans for the new building call for a one-story structure, 100 x 400 ft. Work will be started within six months. The location permits sidings from the Buffalo, Rochester & Pittsburgh and the New York Central.

A bulletin of the phono-electric wire made by the Bridgeport Brass Co., Bridgeport, Conn., has been issued printed in French. It covers the physical and electrical characteristics of the wire and contains tables necessary for the intelligent selection of the sizes of wire needed.

To Make Factory Truck Hardware

Hardware for making up a factory truck is a feature of business on which the Oliver Machinery Co., manufacturer of woodworking machinery and machine tools, Grand Rapids, Mich., has embarked. It is in a position to manufacture the complete truck, but on the basis that it will serve furniture factories, pattern shops, wood shops of various kinds and foundries, which are likely to have carpenters or woodworkers in their employ, it expects to find a wide field for the sale of the hardware needed in connection with the woodwork for building factory trucks.

The plan is to sell the hardware on a foundry basis, that is, at a net price that will be low enough to make the purchases attractive and obtain a lower freight classification than would apply to the manufactured truck. With each order will be sent a blueprint showing how to cut each piece of lumber to make it fit. The hardware includes wheels and their supports, various brackets, bolts and screws and the castings into which stanchions are fitted.

British Turning to Oil Fuel

One outstanding result of the big strike in the coal mines of Great Britain has been an increasing use of oil as fuel, in place of the coal almost universally used heretofore. Fuel oil imported into the United Kingdom in the first five months of 1921 aggregated 198,000,000 gal., as compared with 319,000,000 gal., in the entire twelve months of 1920 and 185,000,000 gal. in the whole of 1913. Monthly averages show 39,600,000 gal. in 1921, 26,500,000 gal. in 1920 and 15,400,000 gal. in 1913.

Announcement early in June of the conversion of three locomotives of the North Staffordshire Railway from coal burners to oil burners indicates a movement which is already well under way, in the changing over of railroad fuel to oil. The system adopted is reported to be the same as that in use on the Midland Railway, which is said to have been chosen because of its extreme simplicity and ease and cheapness of fitting. No structural alteration was required in the firebox or ash pan, and it is said that either oil or coal, or both combined, can be burned in the engines as now fitted up.

The burner, placed in the firebox, is supplied with oil from a 450-gal. tank fitted on top of the coal bunker. Steam is supplied to it from a stop valve on the boiler, and the oil is regulated by a simple plug cock. It is said that, with a very little practice, the engineer can regulate the supply of oil and steam in such a manner as to produce satisfactory results. The capacity of the tank is sufficient for more than a full day's work, and engines so fitted are reported to have done exceedingly well in both passenger and freight service.

Motion Pictures Obtainable from Bureau of Mines

Two educational motion pictures illustrative of the mineral industry have recently been completed, the United States Bureau of Mines announces. The first of these, the story of abrasives, shows the generation of power at Niagara Falls, its utilization for the production of carborundum (silicide of carbon), and aloxite (aluminum sesquioxide), and finally the numerous interesting and important industrial operations that are performed with the aid of the abrasives thus manufactured.

The story of rock drilling shows the use of modern types of rock drill, not only for shaft-sinking and underground operations, but also for quarrying and the cutting of the new hydro-electric power canal to connect Lake Erie with Lake Ontario. Requests for the loan of these films for showing at public gatherings where no admission fee is charged should be addressed to the Bureau of Mines, 4800 Forbes Street, Pittsburgh, Pa.

Machinery Markets and News of the Works

AWAITING REDUCTIONS

Rock Island Railroad Will Not Buy Until Prices Are Lowered 40 Per Cent

Vocational Schools Furnishing Business—July Better Than June in Chicago

Only in one center is it definitely reported that July is a better month than June. This is Chicago, where railroad business has given a little life. The Illinois Central has ordered some of the smaller equipment asked for and was expected to close on the remainder early this week, the total purchases not exceeding $100,000. The Rock Island has added two lathes to its list and has informed dealers that it will not buy until there is a 40 per cent price reduction. Action on the H. W. Johns-Manville Co. list will not be taken for a month.

Vocational schools are among the chief current buyers. The public schools of Philadelphia have purchased about 40 machines, principally speed lathes and drill presses. The McKinley school, Canton, Ohio, will receive bids July 29 on a list amounting to nearly $50,000. In several centers the used tool business is more lively than that of new equipment.

Fifteen tools have been purchased by Dwight P. Robinson & Co., New York, for a project in Brazil, additional purchases to be made in the near future. The American Sugar Refining Co. has sent out a revised list of 16 machines for its Baltimore refinery.

Recent price reductions include the following: Ten per cent on motors of the General Electric and Westinghouse companies; 20 per cent reduction in high speed drills; a reduction of 15 per cent from 1919 prices by a Paterson, N. J., maker of upright drills; 10 per cent reduction on grinding and buffing machinery and disk grinders by a Grand Rapids, Mich., maker. Some makers of taps and dies in New England contemplate further reductions.

New York

NEW YORK, July 26.

The largest machine-tool purchases of the past week were made by Dwight P. Robinson & Co., 125 East Forty-sixth Street, New York, and for a project in Brazil. About 15 tools were bought and other purchases will be made within the near future. The American Sugar Refining Co., New York, has issued a revised list of about 16 tools for its new Baltimore refinery. A few months ago this company issued an inquiry for about 50 machines, a few of which, including punching and shearing machines and pipe machines, were purchased. The remainder of the list has been issued in revised form with a part of the tools formerly inquired for eliminated. Otherwise the market is extremely dull, purchases being confined to single tools and few of these.

The crane market is quiet, little activity either in inquiries or orders being reported. On the few inquiries that are active competition is keen. The Lehigh Valley Railroad, 143 Liberty Street, New York, has asked for bids on two coal-handling units for erection in New Jersey. There are a few export inquiries in the market and some transactions in hand-power cranes. The New Jersey Foundry & Machine Co. was recently awarded the two 10-ton, 20-ft. span hand-power cranes purchased by the United States Engineer's office, Norfolk, Va. The Chesapeake Iron Works has sold to the American Sugar Refining Co. four overhead traveling cranes of about 3-tons capacity, 25-ft. 2-in. span, equipped with three trolleys, each with a lifting capacity of 2275 lb. for installation at the Baltimore plant of the company.

The Kingsbridge Iron Works, Inc., 405 East Ninety-ninth Street, New York, has acquired the old Morris Park race track, near Fowler Avenue, comprising 14 lots, for $50,000. The property will be improved for the establishment of a new plant for the manufacture of ornamental iron products.

The G. E. Fixture Co., New York, has been incorporated with a capital of $25,000 by H. Firman, J. Moscoff and J. N. Chamkin, to manufacture gas and electric fixtures. The company is represented by H. Solomon, 332 Broadway.

The Electro Thermo Co., New York, has been incorporated with a capital of $100,000 by C. C. Trautmann, W. L. Strauss and P. Becker, to manufacture electrically operated washing machines. It is represented by C. A. Oberwager, 233 Broadway.

L. Robaczynski, 96 Meserole Street, Brooklyn, manufacturer of knitting machines and parts, has had plans prepared for a new one-story machine shop, 41 x 96 ft., on Grand Avenue, to cost about $12,000. Louis Allmendinger, 20 Palmetto Street, is architect.

The McFarland-Clum Corporation, Brooklyn, has been incorporated with a capital of $75,000 by G. T. McFarland, R. V. Clum and J. G. Snyder, 256 Broadway, New York, to manufacture electric devices for automobiles and similar products.

The National Metal Box Co., Brooklyn, has been chartered under State laws to manufacture metal boxes and containers. The incorporators are M. B. Gulbin, M. Feld, and R. Barko, 51 Chambers Street, New York.

The Multiple Storage Battery Co., Van Wyck Avenue, Jamaica, L. I., manufacturer of storage batteries, has arranged a list of equipment for installation in its one-story addition, 50 x 120 ft., estimated to cost about $55,000.

Charles L. Cadle, Superintendent of Public Works, Capitol Building, Albany, N. Y., will receive bids until 12 o'clock noon, Aug. 17, for furnishing and installing two 3-ton, semi-portal, revolving jib cranes at the Barge Canal terminal, Gowanus Bay, Brooklyn.

The Neth Wire Tying Machine Corporation, New York, has been incorporated under Delaware laws with capital of $500,000 by E. A. Perry, Jr., J. L. Ward and G. Dixon Raine, Jr., New York, to manufacture wire baling machinery and parts. It is represented by the Corporation Service Co., Wilmington, Del.

The Super Clarion Corporation, New York, has been chartered under State laws to manufacture special machinery and parts. The incorporators are G. Fleck, J. J. Platzman, and L. W. Dinkelspiel, 5 Beekman Street.

The Roman Bronze Works, 275 Greene Street, Brooklyn, has leased a one-story building, 50 x 60 ft., to be erected by M. T. Kelly at Provost and Greene streets, at a cost of $20,000, for a new foundry. The construction contract has been let to C. C. Woodruff, 213 Tenth Street, Long Island City.

The New York Central Railroad Co., Grand Central Terminal, New York, will receive bids until 12 o'clock noon, Aug. 3, for shop material, covering requirements up to Sept. 1, as follows: Black, galvanized and blue annealed sheets; driving and truck tires for freight and passenger service; seamless steel tubing; car and tender axles; car axles for axlelight system; driving and trailer truck axles; front engine truck axles; standard wire nails; galvanized and polished fence staples; steel bars; steel shapes; steel plates; galvanized tie dating nails; and woven wire fence. Bids will also be received until 12 o'clock noon, Aug. 1, for the following: Track bolts, track spikes, angle bars, tie plates, frogs, switch points, switches, switch plates, crossing frogs, terminal stud track bonds, guard rails, knuckle rails, and movable points for crossings, all in accord with standard plans and specifications of the company on file at the

office of W. C. Bower, general purchasing agent, Grand Central Terminal.

The Henry, Millard & Henry Co., New York, has been incorporated under Delaware laws with capital of $150,000 to manufacture iron and steel products. The incorporators are H. H. Walker and J. F. O'Connor, Brooklyn. The company is represented by the Capital Trust Co., Dover, Del.

The Netherlands Aircraft Mfg. Co., Amsterdam, Holland, represented in the United States by R. B. C. Noorduyn, Hazelhurst Field, Mineola, L. I., is planning for the establishment of works in the vicinity of New York for the manufacture of airplanes, airplane motors, etc. Anthony G. H. Fokker is head of the company.

Fire, July 20, destroyed a portion of the plant of I. Block & Son, 393 Pearl Street, New York, manufacturer of oil and gas stoves, with loss estimated at about $150,000.

The Westinghouse Electric & Mfg. Co., 165 Broadway, New York, with main plant at East Pittsburgh, Pa., has taken a contract for furnishing electric machinery and equipment for the electrification of the Chile State Railroad, operating from Santiago to Valparaiso, at a cost of approximately $3,000,000.

The Thatcher Propeller Co., Albany, N. Y., care of Pember & Campaigne, architects, 24 James Street, manufacturer of airplane and boat propellers, has plans under way for new works. It is understood that bids will be asked in August.

The Steelcraft Corporation of America, 2341 East Sixty-ninth Street, Cleveland, manufacturer of safes, locks, etc., is planning for additions to the plant of Howell, Field & Goddard, Inc., Review Avenue, Long Island City, following the purchase of a controlling interest in this organization. The Long Island city works are devoted to the metal-clad doors and other metal fireproof products, with present output totaling about 200 doors per day. This capacity will be increased. The Steelcraft company also operates the Stiefel & Freeman Works, Lititz, Pa. B. H. Sinks is president.

The Giant Drill Extracting Machine Co., Jersey City, N. J., has been incorporated with a capital of $100,000 by Henry L. Berstleman, Gilbert C. Cadwaller and James F. McCormack, 76 Montgomery Street, to manufacture special machinery and parts.

The Florence Pipe Foundry & Machine Co., Florence, N. J., has awarded a contract to the Austin Co., Bulletin Building, Philadelphia, for a one-story addition on Front Street, 40 x 100 ft., to cost about $25,000.

The Davis Equipment Co., Bayonne, N. J., has been incorporated in Delaware with a capital of $250,000 to manufacture machinery and parts. The incorporators are Julian Rice and John V. Corcoran, Bayonne. The company is represented by the United States Corporation Co., Dover, Del.

Fire, July 15, at the oil refinery of the Tide Water Oil Co., Constable Hook, Bayonne, N. J., caused a damage estimated at about $200,000.

The loss, caused by fire at the plant of the Warner Quinlan Asphalt Co., 79 Wall Street, New York, at Linden, N. J., July 18, estimated at $3,500,000, included the tool and machine shops, power plant, laboratory and other buildings, as well as 18 asphalt tanks, 33 oil tanks, 12 gasoline tanks and 16 oil stills. The insurance is now being adjusted, and the company plans for the early rebuilding of the works. Charles Almquist is superintendent.

The Ward Electric Shop, Inc., Boonton, N. J., recently organized with a capital of $25,000 to manufacture electrical specialties, has acquired a plant at 813 Main Street. It is headed by Nelson C. Doland, Joseph A. and William E. Ward.

The Essex Fells Water Co., Essex Fells, N. J., will install a new electrically operated pump at its plant at Verona. A new 350,000-gal. water reservoir will also be constructed.

Thomas A. Edison, Inc., West Orange, N. J., manufacturer of electrical products, is planning for the erection of an addition to the power house.

Swift & Co., 154 Ninth Street, Jersey City, N. J., will build an addition to the power house at their local packing plant to cost about $25,000.

The Cook New Method Engine Co., Irvington, N. J., has been incorporated with a capital of $125,000 by J. Thomas Cook, Alfred T. Goullet and Fred H. Hill, 180 Laurel Place, Irvington, to manufacture engine equipment for automotive service.

The Eastern Metal Stamping Corporation, Newark, has been incorporated with a capital of $250,000 by William G. Viall, Thomas W. Paterson and Frederick A. Slater, Newark, to manufacture metal goods. It is represented by Karl Z. Kiefer, 810 Broad Street.

Property of the Accurate Screw Machine Co., comprising a machine works and equipment at Fifth and Cross streets, Harrison, N. J., will be sold by Mortimer Lowy, receiver for the company.

The International Water Heater Co., Newark, has been incorporated with a capital of $500,000 by James B. Adams, Frank Williams and Charles H. Giese, 142 Market Street, to manufacture water heaters and similar products.

The Behrens Crane Co., Merchantville, N. J., has been incorporated with a capital of $125,000 by Albert Burling and J. N. Wilkins, Merchantville, to manufacture cranes, parts, etc.

New England

BOSTON, July 25.

The machine tool market the past week has been devoid of features. Inquiries, classified as active prospects, apparently are no nearer the closing stage and new prospects are lacking. Based on New England industrial conditions the outlook for improved business within the next month, at least, is not particularly encouraging. Sales the past week were confined to about a half-dozen individual tools, which went at prices considerably below list quotations. A. Paterson, N. J., manufacturer of upright drills has issued a new price list showing an average reduction of 15 per cent from 1919 quotations. July will close as one of the leanest months on record for a majority of local machine tool houses.

Some New England manufacturers of taps and dies contemplate a further reduction in prices in the hope of moving large stocks on hand. During the period from Jan. 1 to June 30, one of the largest makers is understood to have made $136 worth of stock for every $100 sold, notwithstanding a steady reduction in operations until 40 per cent of normal was established.

Contract has been let for the erection of a power plant addition, 60 x 64 ft., by the United Illuminating Co., New Haven, Conn.

The Collins Co., Collinsville, Conn., agricultural tools, hammers, axes, etc., will expend considerable money in repairs and in renovating its small press grinding department.

Nathan D. Cass, president N. D. Cass Co., Athol, Mass., toys, with others, proposes to open a plant in Manchester, Vt., under the firm name of the N. D. Cass Toy Co. of Vermont. A saw mill will be erected.

The Bakers Standard Equipment, Inc., Boston, with a capital of $100,000, has taken a Massachusetts charter. Leo R. Zusman, 50 Russell Street, Brookline, is president, and S. Mitchell, 106 Lucerne Street, Dorchester, treasurer.

A Massachusetts charter has been granted the Oxford Steel Products Co., Boston, capitalized for $300,000, of which Clarence E. Dodge, 2 Myers Street, Boston, is president, and Maurice T. Viall, 155 Armington Street, Cranston, R. I., treasurer.

Marx C. Kristek, 17 Court Street, is president, and Harry A. Katz, 7 Jones Street, treasurer, Kristek Mfg. Co., Worcester, Mass., capitalized for $50,000, recently granted a charter to manufacture taper pins, firearm pins, clock studs, etc.

Plans are being figured for a two-story plant, 75 x 125 ft., for the Chandler Machine Co., Ayer, Mass. Part of the building will be used as a garage.

The Sterling Roofing Co., New Bedford, Mass., will erect a one-story manufacturing plant, 75 x 150 ft.

Contract has been let for the erection of a one-story and basement repair shop, 102 x 218 ft., at Greenfield Junction, Me., for the Great Northern Paper Co., to cost $100,000.

Additions to the machine and finishing departments to cost about $30,000 will be made at the paper manufacturing plant of Tileston & Hollingsworth, Hyde Park, Boston. Plans have been completed.

The Marcy Tool Works, Inc., Putnam, Conn., has been incorporated with a capital of $100,000 by H. Devine and A. W. Marcy, Hillcrest Grandview Avenue, Putnam, to manufacture tools, hardware specialties, etc.

The Lindquist Engineering Works, Inc., Marlborough Street, Portland, Conn., recently incorporated to manufacture mechanical products, has been organized with C. O. Hedstrom, Main Street, as president, and E. A. Lindquist, Middletown, Conn., secretary and treasurer.

The Central Maine Power Co., Augusta, Me., has arranged for a bond issue of $3,000,000 for extensions, improvements, general operations, etc. Harvey D. Eaton is president.

The American Tube & Stamping Co., 471 Hancock Avenue, Bridgeport, Conn., is planning the erection of a one-story addition on Wordin Avenue for the manufacture of rolled steel specialties.

The Capitol Auto Top Co., 28 Goodman Place, Hartford, Conn., has filed notice of organization to manufacture automobile tops and kindred equipment. D. N. Renken, 55 Shultas Place, heads the company.

The J. M. Craig Brass Foundry, Arch Street, Hartford, Conn., has awarded a contract to Charles P. Waterman,

Inc., 75 Pratt Street, for extensions and improvements in its plant.

O. P. Thompson, 145 State Street, Springfield, Mass., and associates, are having plans prepared by R. B. Warner, architect, 168 Bridge Street, for the erection of an eight-story automobile service and repair works on Dwight Street, 100 x 150 ft., estimated to cost about $600,000 with equipment.

Philadelphia

PHILADELPHIA, July 25.

Business in second-hand machinery is better than that in new tools. One used machinery company contemplates furnishing part, or all, equipment toward a $40,000 outlay for tools; it also expects to get some or all of the business of a $90,000 expenditure. Inquiries have been received in this district by second-hand machinery dealers for sizable lists, both from Chicago and Milwaukee dealers. The chief second-hand demand is for fabricating machinery, such as bending rolls and punches and shears.

Principal purchases are by vocational schools. Twenty-four speed lathes, eight drill presses, four 14 in. x 5 ft. engine lathes, one arbor press and three double-end emery wheel stands were sold July 18 to three new schools in Philadelphia, the Tilden Junior High School, the Mitchell Junior High School and the Thomas Junior High School. A vocational school at Scranton also purchased some tools.

There has been a fair number of inquiries, but many are for appraisal purposes and buying on others is deferred in the hope of further recessions in prices. Recent reductions include one of 10 per cent on motors by the General Electric and Westinghouse companies, effective July 11, and a 20 per cent reduction on high speed drills. Steam hammers have now been reduced to less than half the price prevailing during the war.

Several Philadelphia dealers received business from the Government which used up some of its surplus money, held over at the end of the fiscal period on June 30, for the purchase of tools. Export business is reported about one-tenth of that in 1913 and 1914.

Business is so slack that some houses are reducing their selling and office forces. Most dealers are making expenses and consider themselves fortunate in so doing.

The O'Brien Machinery Co., 119 North Third Street, Philadelphia, has rejected bids for its proposed four-story and basement building at 113 North Third Street, and will call for new bids at a later date. H. F. Schultze, 11 South Sixteenth Street, is architect.

The Automatic Clutch & Transmission Co., Philadelphia, has been incorporated under Delaware laws with a capital of $1,200,000 to manufacture power transmission and controlling equipment. F. R. Hansell, Land Title Building, represents the company.

The Danda Co., Philadelphia, has been chartered under State laws to manufacture valves and similar products. Kern Dodge, 5135 Pulaski Avenue, is treasurer.

The Bridgman Brothers Co., 120 South Thirtieth Street, Philadelphia, manufacturer of pipe, steam fitters' supplies, etc., is completing plans for a new one-story building at Thirty-first and Walnut streets. Clarence E. Wunder, 1415 Locust Street, is architect.

The Pneumatic Street Cleaner Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 by Robert L. Holliday and Mirabeau Sims, Philadelphia, to manufacture street-cleaning machinery and parts. A general iron foundry will also be conducted. The company is represented by James Saulsbury, Equitable Building, Wilmington, Del.

The Victor Talking Machine Co., Camden, N. J., closed its plant, July 25, for two weeks, during which time repairs and improvements will be made to machinery. It is now giving employment to about 12,000 operatives.

The F. M. Hall Refrigerating Co., Camden, N. J., has been chartered under State laws with 20,000 shares of stock, no par value, to manufacture refrigerators and refrigerating equipment. The incorporators are E. and Frank M. Hall, and John A. Penn, 428 Market Street.

Milton Mirkens, Trenton, N. J., has acquired the former Ewing Rubber Mill on Hilton Avenue, for the establishment of a new plant to manufacture rubber goods. The building, on a site 206 x 235 ft., will be remodeled and machinery installed at an early date.

Plans have been filed for the erection of a new one-story power house and engine plant by the Enterprise Furniture Co., Glen Rock, Pa. W. E. S. Dyer, Land Title Building, Philadelphia, is engineer.

The Reading Knob Works, Inc., Reading Pa., has been incorporated with a capital of $175,000 to manufacture door knobs and kindred products. James A. Yuill, Wyomissing, is treasurer.

The Lehigh Coal & Navigation Co., Lansford, Pa., will commence the immediate erection of a new coal breaker at Coaldale, Pa., estimated to cost about $1,000,000, including machinery, to replace the structure recently destroyed by fire.

The Myers Machine Tool Co., Columbia, Pa., has preliminary plans under way for a one-story building, estimated to cost about $10,000. Granville E. Paules, Bucher Building, is architect.

The Enamel Products Corporation, East Stroudsburg, Pa., has been incorporated with a capital of $50,000 to manufacture enamelware specialties. Louis Rupprecht, East Stroudsburg, is treasurer.

The International Mfg. Co., Weatherly, Pa., recently acquired by new interests, will begin production early in August on window screens, ventilators and other metal products. Howard A. Koch, Fleetwood, Berks County, is treasurer.

The Pennsylvania Edison Co., Reading, Pa., has disposed of a bond issue of $125,000 for improvements and extensions in electric plant and system, general operations, etc.

The Bee Automobile Co., 620 Linden Avenue, Allentown, Pa., has acquired the property now occupied, and adjoining land, extending to Court Street. It is operating a complete repair department with machine and forge shops, and a portion of the site will be used for the erection of a new building. Frank H. Bachman is president, and R. H. Bachman, secretary and treasurer.

The Capitano Steel Squares Co., Pittston, Pa., has been incorporated with a capital of $30,000 to manufacture steel specialties. Alexander Capitano, Pittston, is treasurer.

Chicago

CHICAGO, July 25.

The Illinois Central has placed orders for some of the smaller equipment on its list and will probably close for the remainder early this week. The total purchase by this road will probably not exceed $100,000. The Rock Island has added a 36-in. x 14-ft. and an 18-in. x 6-ft. lathe to its list and at the same time has informed dealers that no buying will be done until prices have been reduced 40 per cent below present levels. The prospects of an early purchase by this road are therefore not considered bright. Although business is still dull, the purchase by the Illinois Central and orders received from industrial concerns will bring sales totals for July above the unusually low record for June. The Stephenson-Adamson Mfg. Co., Aurora, Ill., has bought the tools for which it was reported as inquiring last week. Action on the H. W. Johns-Manville Co. list, published last week, will not be taken for about a month, and there is some doubt as to whether orders will be placed by the Milwaukee or the New York purchasing offices of the company.

No action has been taken on the lists for the Federal vocational schools at Jacksonville, Ill., or Valparaiso, Ind. Purchases for the latter school are to be made at Cincinnati. As noted in this column some weeks ago, second-hand equipment was bought for a Federal vocational school at Karlov and Polk streets, Chicago. It is now reported that further purchases are to be made.

The Valley City Machine Works, Grand Rapids, Mich., has reduced prices 10 per cent on its grinding and buffing machinery and disk grinders.

The Sewell Clapp Envelope Co., 23 North Des Plaines Street, Chicago, has let a contract for a factory, 209 x 300 ft., at 4201-4219 Belmont Avenue, to cost $250,000.

The Illinois Central Railroad Co. is having plans prepared for a one-story repair shop and four-stall roundhouse at Herrin, Ill., to cost $60,000.

The American Tar Products Co., 208 South La Salle Street, Chicago, has purchased 40 acres at the southwest corner of Pershing Road and Fifty-second Avenue as a site for a new plant to cost $1,500,000. It now has works at St. Louis, Milwaukee, Youngstown, Birmingham, and Steubenville, Ohio.

The Automatic Control & Signal Corporation, 202 South Clark Street, Chicago, has been incorporated with $500,000 capital stock to manufacture safety devices and accessories. The incorporators include H. E. Bourdette, A. J. Brookins, R. L. Laird, W. H. Potter, et al. Correspondent: Laird, Scheyer & Sullivan, 127 North Dearborn Street, Chicago.

The Potter Specialties Co., 140 North Dearborn Street, Chicago, has been incorporated with $100,000 capital stock to manufacture automobile devices and accessories. Prominent among its products will be a signalling device for automobiles. Incorporators include M. E. Koch, Leo W. Gardner, and Carle F. Potter. For the present the company

will contract for the manufacture of its products, but later a factory will be secured. Correspondent: Ela, Grover & March, 140 North Dearborn Street.

The Waukegan Foundry Co., Waukegan, Ill., has the construction of its foundry well under way. The building will be 276 ft. in length and will have 15,300 sq. ft. of floor space. A 35-ft. Whiting cupola has been installed and operation is expected to start about Aug. 1.

The Sapihl Electric Tool Co., manufacturer of electric grinders and drills, has taken quarters in the Willis Mfg. Co. building, Galesburg, Ill., and will begin at once to equip it for manufacturing purposes. The company will employ about 15 skilled men to start with.

The Metal-Craft Mfg. Co., 64 West Randolph Street, Chicago, recently incorporated, will manufacture metal office furniture, sheet metal fixtures and factory and shop equipment, such as bins, shelving, cabinets, tool stands, lathe pans and jigs. N. M. Cottrell is president.

Fire, July 13, destroyed the plant of the Lewis Roofing Co., Moline, Ill., with loss estimated at about $200,000, including equipment.

The North American Car Co., 328 South La Salle Street, Chicago, has preliminary plans under way for a new one-story shop, 80 x 120 ft., at 135th Street and California Avenue, Blue Island, Ill., to cost about $40,000. It is expected to call for bids early in August.

The Russell Grader Mfg. Co., 2037 University Avenue, Minneapolis, Minn., has preliminary plans under way for its new one-story plant in the new Industrial District for the manufacture of agricultural machinery. It will comprise several one-story buildings and is estimated to cost about $450,000 with machinery. Sund, Dunham & Ludwig, 514 Essex Building, Minneapolis, are architects.

The Hercules Powder Co., du Pont Building, Wilmington, Del., is planning for extensions and betterments in its plant at Rayville, Ill. The works have been closed for some time past and it is proposed to resume production early in the fall.

Fire, July 17, destroyed a portion of the plant of the Midwest Refining Co., Casper, Wyo., with loss estimated at about $50,000.

The City Council, Corning, Iowa, has commissioned C. K. Munns, engineer, Corning, to prepare plans for the proposed municipal electric light and power plant, estimated to cost about $60,000.

The Bettendorf Co., Davenport, Iowa, manufacturer of steel cars, machinery, etc., has acquired the plant and business of the B. L. Schmidt Co., Davenport, manufacturer of cylinder grinding machines. It will be continued in operation and no immediate changes, it is said, are planned.

Pittsburgh

PITTSBURGH, July 25.

Never before in the memory of those now active in the machine tool trade has business been so nearly at a standstill as at present. Dealers report a dearth of inquiries the past week and very few sales. In cranes and the heavier lines practically nothing has been closed since last accounts and there seems to be no life to inquiries that have been before manufacturers for several weeks. It does not seem to be so much a matter of price but more a question of whether this is the time to buy. General business, however, is not reviving as rapidly as could be expected.

The Troop Mfg. Co., 218 First Avenue, Pittsburgh, manufacturer of stoves, heaters, ranges, etc., has acquired property on Jane Street, heretofore held by the Enterprise Machine Co., 120 x 120 ft., improved with a two-story building, to be used in connection with its works.

The Reliance Boiler Works, Inc., Pittsburgh, has been incorporated with a capital of $40,000 to manufacture boilers, tanks, etc. H. C. Feldstein, 1608 Center Avenue, is treasurer.

The Standard Underground Cable Co., Westinghouse Building, Pittsburgh, has preliminary plans under way for a new plant on Sixteenth Street. The W. G. Wilkins Co., Westinghouse Building, is architect and engineer. The company is also said to be arranging details for its new plant at Kings Highway and Slevin Avenue, St. Louis, estimated to cost about $1,000,000 with machinery. Joseph W. Marsh is president.

The Builders' Steel Works Co., Pittsburgh, has been incorporated with a capital of $50,000 to manufacture steel and iron specialties. W. H. Miller, 44 South Howard Street, Bellevue, Pa., is treasurer.

The Robinson Ventilating Co., Harmony, Pa., has completed plans for a new one-story machine shop, 60 x 120 ft., estimated to cost about $25,000. Two electric traveling cranes will be installed.

The Board of Directors, Uniontown Hospital, Uniontown, Pa., has filed plans for the erection of a new power house at the institution.

The Hawkins Traction Flange Co., Pittsburgh, has been chartered under State laws to manufacture railroad flanges and kindred equipment. A. C. Pauley, 352 Fingal Street, is treasurer.

The Euclid Auto Construction Co., Pittsburgh, is arranging plans for extensions in its truck and automobile body manufacturing department for increased production.

The South Penn Oil Co., Morgantown, W. Va., is planning for extensions and improvements at its local plant to cost about $300,000.

The Romisch Mfg. Co., Morgantown, W. Va., will break ground early in August for a new two-story foundry and machine shop, 50 x 50 ft., on Beechurst Avenue, to replace its building recently destroyed by fire. Anthony Romish is head.

The Tri-State Equipment & Repair Co., Kenova, W. Va., has been incorporated with a capital of $50,000 for the operation of a local plant to manufacture automobile parts and equipment, with general repair department. The company is headed by J. W. Havner, Huntington, W. Va., and W. D. Sutton and A. S. Glenn, both of Ashland, Ky.

The Logan Machine Shops, Logan, W. Va., has awarded a contract to the McClintic-Marshall Co., Pittsburgh, for its new two-story machine shop, 60 x 100 ft., to replace the structure recently destroyed by fire.

The Marion Motor Co., 304 Jacobs Building, Fairmont, W. Va., recently organized with a capital of $40,000, will soon commence the erection of a new plant, 42 x 70 ft., to manufacture automobile parts and equipment. L. Glenn Roop is president and J. R. Cole, secretary and treasurer.

The former plant of the Williams Rubber Co., Buena Vista, near McKeesport, Pa., has been acquired by new interests, with company now forming. The works will be remodeled and machinery installed for the manufacture of mechanical rubber specialties.

The W. W. Martin Co., 5847 Center Avenue, Pittsburgh, has filed plans for a new three-story automobile service and repair works, 100 x 140 ft., at Ravenna Street and North Highland Avenue, to cost about $150,000.

The West Virginia Foundry & Stove Works, Huntington, W. Va., has plans under way for a one-story foundry, 50 x 120 ft., and works building, 30 x 130 ft. The present plant will be removed to the new location, and additional equipment installed to double, approximately, the present capacity. Frank C. Boggess is manager.

The Century Mfg. Co., Charlestown, W. Va., recently organized with a capital of $250,000, is planning for the establishment of a new plant to manufacture talking machines and parts, including spring motors, attachments, etc. The company is headed by William Lehmeyer, L. A. Tinder and E. A. Reid, Charlestown.

The Buckhannon Light & Power Co., Buckhannon, W. Va., is planning for the immediate erection of its proposed new power plant.

Detroit

DETROIT, July 25.

The Whitehead & Kales Co., Detroit, has begun construction on the structural steel work for the new plant of the Durant Motors, Inc., Lansing, Mich., to be finished in six weeks. More than 500 men are employed on the site.

The National Alloys Co., Detroit, has been organized with an authorized capitalization of $200,000 to manufacture brass, bronze and aluminum castings and is seeking a plant. The incorporators are W. J. Reardon, John G. Collins, and Horace H. Lane, 2320 Dime Bank Building.

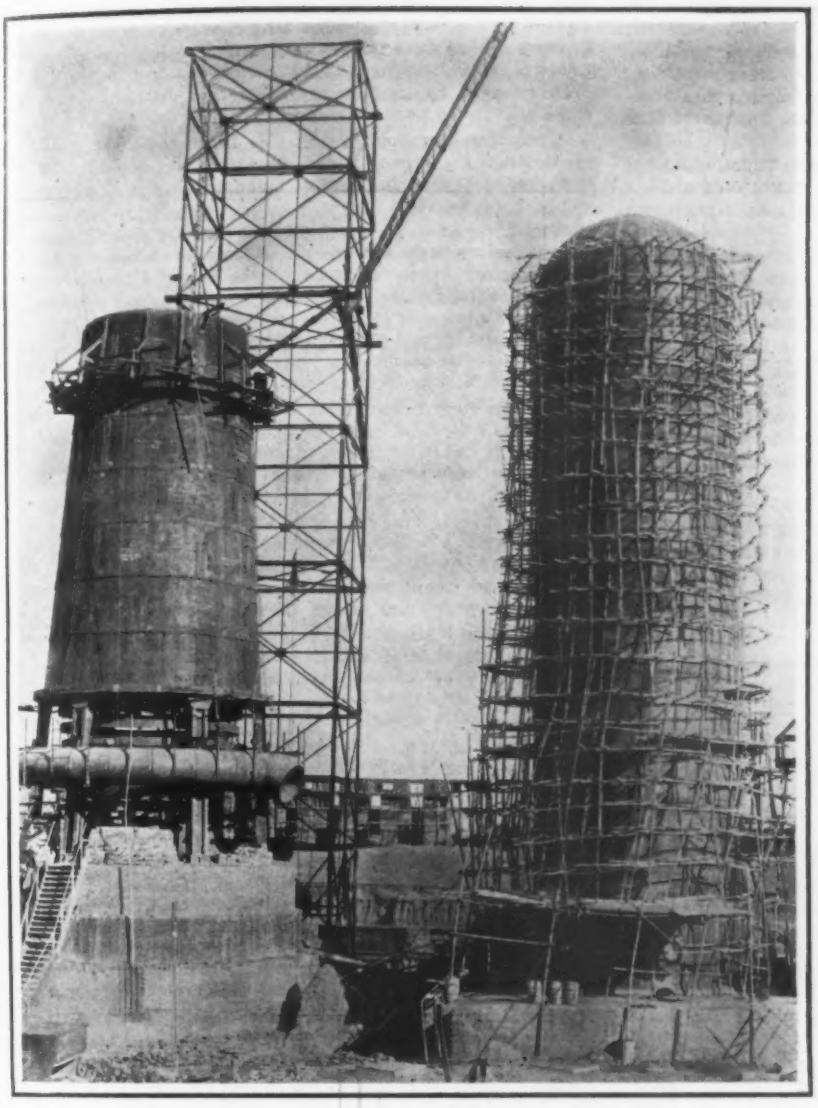
The Benton Tool Co., Benton Harbor, Mich., has been incorporated by Frank L. Sharer, S. W. Trick and A. S. Lindenfeld to manufacture hardware specialties and other metal products. It is expected to begin production in a few weeks in an established plant. The capitalization is $100,000.

The Continental Motors Corporation is tooling up its Detroit and Muskegon plants to handle an order from Durant Motors, Inc., for 2500 motors. Several fair-sized orders for equipment have been placed.

The City Council, Detroit, has placed with the Kuhlman Car Co., Cleveland, an order for 50 one-man trolley cars at a cost of $351,250.

The W. J. Baird Machinery Co., Detroit, has purchased a six-story building, 63 x 100 ft., at Jefferson Avenue and Brush Street, which will for the present be leased to companies wishing space for light manufacturing.

The Detroit Street Railway System, Detroit, Ross Schram, secretary, Murphy Building, Detroit, is taking bids for the erection of the new municipal car shops at St. Jean and Shoe-



Erection of Blast Furnace in India

At the left there will be found a construction view of the new blast furnace plant being erected by Arthur G. McKee & Co., Cleveland, for the Indian Iron & Steel Co., at Asansol, India, near Calcutta. The work is being done by native labor, which is not breaking any records for speed in construction. As shown in the picture, a bamboo scaffold was built around the stove. The McKee company has not been informed whether this scaffold was used in building the stove, or was erected only for use in putting on the dome. The photograph shows that a traveler of rather familiar design is being used in erection work, and the picture of the furnace stack indicates that usual construction methods are being followed in building the stack.

All the steel for the furnace was fabricated in the United States and marked for erection purposes. Part of the plate work was shipped ready for erection and part shipped straight, being curved in rolls after reaching its destination. The construction of the No. 1 furnace shown on the photograph is now well along and the McKee company has started the erection of the second stack.

maker streets, one-story, 260 x 370 ft. William C. Markha, 312 Marquette Building, is engineer.

The Algonac Machine & Boat Works, Inc., Algonac, Mich., has been incorporated with a capital of $25,000 by J. M. and C. C. Smits and J. DeBruyn, Algonac, to operate a general machine and repair works.

The Britton Axle Co., Alma, Mich., has been incorporated with a capital of $3,500,000 by William M. Britton, Alma; W. J. Wickes and Frank H. Payne, Saginaw, Mich., to manufacture automobile axles and kindred equipment.

The Renulife Electric Co., 614 Marquette Building, Detroit, manufacturer of electrical specialties, has rejected all bids for the erection of its new three-story plant, 42 x 90 ft., at 1234 Abbot Street, and the project will be held in abeyance. The plant was estimated to cost about $75,000. A. Frank Herman and H. T. Simmons, 411 Owen Building, are architects.

The Muskegon Piston Ring Co., Muskegon, Mich., has been incorporated with a capital of $20,000 by George W. Olson and Joseph Kitzinger, Muskegon; and John R. Nix, Muskegon Heights, to manufacture piston rings and other automotive products.

The Acme Etched Products Co., Detroit, has been incorporated with a capital of $28,000 by Fred S. Osborn, Howard Atoshian and Paul C. Renaud, 99 Willis Avenue, to manufacture metal name plates.

The Hinkley Motors Corporation, 3420 West Fort Street, Detroit, has awarded contract to the H. G. Christman Co., Stevens Building, for its new plant at Ecorse, Mich., for the manufacture of gasoline engines. The initial works will comprise a main one-story plant, brick and reinforced-concrete, 250 x 340 ft., and one-story power house, 50 x 62 ft. Albert Kahn, 1000 Marquette Building, is architect. H. M. Butzel is secretary.

The Utility Compressor Co., 1161 East Harper Avenue, Detroit, manufacturer of air compressors, has commenced foundation work for its new plant at Adrian, Mich., estimated to cost about $40,000.

The Common Council, Reed City, Mich., is arranging for a bond issue of $70,000 for the erection of a municipal electric light and power plant.

Baltimore

BALTIMORE, July 25.

The American Locomotive Co., 30 Church Street, New York, is planning for the erection of a new one-story forge shop at Richmond, Va., 85 x 160 ft.

The Roanoke-Vinton Ice Co., Roanoke, Va., is planning for the erection of a new ice manufacturing and cold storage plant to cost about $100,000. T. B. Witt is manager.

The Bureau of Yards and Docks, Navy Department, Washington, will break ground at once for a new one-story machine shop and wood-working plant at the Navy Yard, Hampton Roads, Va., to cost about $108,500.

The Clary-Cumming Battery Co., 1218 Hampton Street, Columbia, S. C., is planning for the operation of a local factory for the manufacture of storage batteries and similar equipment. E. M. Cumming is secretary.

Fire, July 16, destroyed the plant of the Roanoke Fiber Board Co., Roanoke Rapids, N. C., with loss estimated at about $300,000, including machinery.

The City Council, Wilmington, Del., has approved an ordinance providing for a bond issue of $600,000, to be used by the Board of Harbor Commissioners in connection with the marine terminal project. A total appropriation of $2,500,000 is available, to be utilized as the work proceeds. The project will include a number of piers and docks, equipped with freight-handling machinery, conveying and hoisting equipment, etc., Contracts for certain features of the work will be awarded at an early date.

Clarence E. Bright and Lawrence J. Mangan, Washington, care of James E. Cooper, architect, 1421 F Street, have plans in preparation for the erection of a new three-story and

basement automobile service and repair building, 145 x 160 ft., on K Street, estimated to cost about $250,000.

The Ray-Shield Mfg. Co., Wilmington, Del., has been incorporated with a capital of $200,000 by Thomas F. and John W. Hogan and Harry E. Algard, to manufacture automobile bodies and parts. P. Warren Green, du Pont Building, represents the company.

The Victor Piston Ring Co., 608 American Building, Baltimore, recently incorporated, contemplates establishing a plant in the near future, but in the meantime will have the rings made by contract.

Clendenin Brothers, Inc., Keyser and Regester streets, Baltimore, has been incorporated with $250,000 capital stock to manufacture metal products. The incorporators are James G. Corckran, James R. Adams and Harold Tschudi.

The Waycross Packing Co., Waycross, Ga., has been purchased by W. H. Baxley, president and manager. The plant is being enlarged and additional machinery will be installed.

The Baltimore Power Plant Co., 743 Calvert Building, Baltimore, has been incorporated to manufacture engines, automobiles, automobile bodies, etc. The incorporators are J. Frank Biddinger, Charles D. Sener and James G. Christhilf, Jr.

The Maryland Metal Building Co., Inc., 801 Munsey Building, Baltimore, has been incorporated with $100,000 capital stock to manufacture portable structures. The incorporators are Frederick J. Maisenholder, William L. Henderson and Aubrey Pearre, Jr.

Buffalo

BUFFALO, July 25.

The Board of Supervisors of Erie County, Buffalo, Maintenance Department, has completed plans for the erection of a one-story automobile service building and machine repair works for county trucks and cars, 62 x 120 ft., at Hamburg, N. Y. Charles Spelch, 583 Ellicott Square, Buffalo, is architect.

City Commissioner Graves, Buffalo, has been directed by the City Council to secure estimates of cost relative to the establishment of a municipal electric power plant, as now being projected.

The Kominz New Chain Mfg. Co., Rochester, N. Y., has been incorporated with a capital of $50,000 by M., A., and J. S. Kominz, to manufacture chains. It is represented by Wile, Oviatt & Gilman, Granite Building.

The Jamestown Carving Works, West Fifth Street, Jamestown, N. Y., has awarded contract to Shellberg & Lindquist, 35 Bush Street, for a two-story addition, 48 x 63 ft., to cost about $20,000.

The Triangle Tool & Die Co., Rochester, has been incorporated with a capital of $25,000 by J. A. and G. E. Ryan and S. J. Emerick, Rochester, to manufacture tools, dies and kindred products. It is represented by Webster, Meade & Straus, attorneys, Rochester.

The Syracuse Cold Storage Co., 101 North West Street, Syracuse, N. Y., is planning to rebuild the portion of its plant destroyed by fire, July 14, with loss estimated at about $25,000, including equipment.

Cleveland

CLEVELAND, July 25.

The improvement noted in the machinery market last week continues, but is more in inquiries than orders. A few buyers are looking around and trying to line up machinery they expect to purchase, but are advising the trade that they will not place orders until business revives. The only inquiry of any size pending is that for equipment for the McKinley School, Canton, previously noted, on which bids will be received July 29. This list amounts to from $40,000 to $50,000.

Some business in single machines was placed at Cleveland and one order from a local manufacturer of automobile parts was for four machines. Reports from Detroit indicate that while automobile manufacturers are operating their plants at probably a better capacity than at any previous time this year, there will be little demand from that source for machinery for some time. Some Detroit manufacturers of automobile parts have a great deal of equipment that is either not being operated at all or only part of the time. With the market for additional equipment so limited some sales organizations are devoting their efforts to attempts to induce manufacturers to supplant present machinery with more modern and more productive equipment.

The Bryan Pattern & Machine Co., Bryan, Ohio, is reported to have taken a large order for pistons for the Ford Motor Co. and may install some additional equipment.

In Cincinnati the machine tool market continues dull, inquiries and sales being confined for the most part to single machines. The inquiry of the Bethlehem Steel Co., Bethlehem, Pa., which includes a 42-in. lathe, is still pending and no action is yet reported on the tools for the American Sugar Refining Co.'s Baltimore plant. The list issued by the Canton, Ohio, Board of Education calling for 25 tools, has been received by manufacturers in this district. There is some activity in used machinery.

The American Tool Works Co., Cincinnati, will close its plant Aug. 1. When in full operation a force of 1200 is employed, although for several months it has only numbered 400.

The London Motor Plow Co., London, Ohio, was recently incorporated for $50,000 for the purpose of building tractors. The company's present model will be changed to include an enclosed rear axle and transmission unit in place of the bull gears and pinions of the present design. The officers include E. H. Daniel, president; P. J. Kirwin and H. Emerick, first and second vice-presidents, respectively; Ray Dunham, secretary, and H. Plimell, treasurer.

The Stewart Phonograph Corporation has moved from Canada to Cleveland and has opened a plant in the Tool & Auto Products Building, St. Clair Avenue and East Forty-ninth Street, and will shortly begin the manufacture of phonographs. L. S. Greenbaum is president and general manager.

The Telestyle Umbrella Co., Findlay, Ohio, has been organized with a capital stock of $150,000 to manufacture telescoping umbrellas. It will acquire the plant formerly used for the manufacture of a similar line of products. Karl L. Schwartz and others are interested.

The General Machine & Tool Co., Akron, Ohio, has been formed to do general machine shop work and will open a plant at 941 Yale Street Extension.

Indiana

INDIANAPOLIS, July 25.

Elwood Haynes, president Haynes Automobile Co., Kokomo, Ind., with other Kokomo capitalists and George J. Marott, Indianapolis, have taken over the holdings of the Holton Tractor Co., Indianapolis. The reorganized concern will be known as the Haynes Tractor Co. and will have $2,000,000 capital. The new tractor, combining the features of the Holton and Powell tractors, will be manufactured at Kokomo, to which city the equipment of the Holton company will be moved. Some of the buildings of the Haynes company will be used until a separate factory is erected.

The Marquette Electric Engineering Co., Chicago, which recently bought the Hotpoint Electric Co., is erecting a plant at Wanatah, Ind., at a cost of $50,000.

The LaBelle Mfg. Co., Indianapolis, has been incorporated with $250,000 capital stock and is seeking a plant with about 75,000 sq. ft. of floor space for the manufacture of washing machines. The officers are J. F. Scott, president; C. S. Walker, secretary-treasurer; H. R. Victor, vice-president.

The Generator Corporation, Poseyville, Ind., has been incorporated with $100,000 capital stock to manufacture galvanized tanks, lighting plants, troughs and other farm equipment. The directors are Otto E. Caudell, Valentine Bender and U. M. Caudell, Evansville; E. D. Fletchell, P. H. Anyle, George Nix and Joseph L. Schafer, Poseyville.

The Johnson Motor Wheel Co., South Bend, Ind., has been sold to G. A. Farabaugh, representing a group of creditors, for $60,000. The formation of a new company is contemplated to manufacture a motor, the invention of Mr. Johnson.

The Marion Foundry Corporation, Marion, Ind., has been moved to Auburn, Ind., where it has established offices with the Auburn Foundry. Castings will be made for a moving grate, the product of the Marion company, and for the Auburn stoker for power plant engines. B. O. Fink is president of the Marion Foundry Corporation, which has a capital stock of $100,000.

The Corcoran Pressed Metal Co. has taken a three-year lease on the Starr Building, Meridian Street and the Belt Railroad, Indianapolis, where it will manufacture sanitary milk cans. It has $100,000 capital stock. L. A. Corcoran is president; L. A. Painter, Pittsburg, Ill., vice-president, and Wilson C. Atkinson, Pittsburg, secretary-treasurer.

The Triangle Steel Products Co., Chicago, care of T. C. Casse, 163 Washington Street, Chicago, architect, has plans under way for a new plant at Michigan City, Ind., one-story and basement, 250 x 500 ft. It is estimated to cost about $75,000.

The Newcastle Casting Co., Newcastle, Ind., has been incorporated with a capital of $100,000 by William T. Applegate and Homer Steinbrink, Newcastle, to manufacture metal castings.

The Advance Rumely Co., La Porte, Ind., manufacturer of agricultural implements, dairy equipment, etc., has preliminary plans under way for a one-story brick and concrete addition. J. C. Llewellyn, 38 South Dearborn Street, Chicago, is architect.

Fire, July 13, destroyed the plant of the Consolidated Stone Co., Bloomington, Ind., with loss estimated at about $250,000, including crushing machinery, stone handling and other equipment. A. E. Dickinson, Bedford, Ind., heads the company.

The Union Steel Mfg. Co., 2955 West Grand Street, Chicago, manufacturer of high-speed steel tools, dies, die castings, etc., with branch works at Brazil, Ind., is arranging for the erection of a new plant at Washington, Ind., where the two present plants will be consolidated and additional equipment provided for increased production. Negotiations with the local Merchants' Association for a site are practically completed. The new plant is estimated to cost close to $100,000.

The Central South

ST. LOUIS, July 25.

The Terrill Tire & Rubber Co., 1512 McGee Street, Kansas City, Mo., has awarded a contract to Frank Woodruff, Clinton, Mo., for the erection of a new two-story and basement tire manufacturing plant at Clinton, 90 x 150 ft. A. C. Terrill is president.

The Automatic Self-Leveling Clock Co., Kirksville, Mo., has tentative plans under way for a new two-story, brick and steel plant, estimated to cost about $100,000. J. T. Dodd is head.

The City Council, Weleetka, Okla., is arranging for a bond issue of $82,500 for the construction of a municipal electric light and power plant. L. T. Newton is city clerk.

The Constantin Refining Co., Tulsa, Okla., operating local oil refineries, has arranged for a bond issue of $4,000,000 for extensions, betterments and general operations. E. Constantin, Sr., is president.

The Common Council, Pawhuska, Okla., is considering the construction of a new municipal electric light and power plant. Estimates of cost and details will be arranged at an early date.

The Southern Brick Co., Bristol, Tenn., is being organized by Charles T. Kilgore, Bristol, and associates, with capital of $90,000, to manufacture brick, tile and kindred products.

The Louisville & Nashville Railroad Co., Louisville, will break ground at once for the erection of its proposed new electric power plant at Paris, Tenn. W. H. Courtenay is chief engineer.

The Hugo Hydroelectric Power Co., Hugo, Okla., is being organized by officials of the local Chamber of Commerce to construct a series of hydroelectric generating plants in this section. Application has been made to the Federal Water Power Commission, Washington, for permission to utilize waters from the Mountain Fork River, Little River and Kiamichi River, the plants to have capacities of 150,000 hp., 100,000 hp. and 50,000 hp., respectively. The project is estimated to cost in excess of $2,500,000, including equipment and systems.

The Ford Tire Machinery Co., Akron, Ohio, is considering plans for the establishment of a new branch plant at Joplin, Mo.

Swift & Co., Union Stock Yards, Chicago, are planning to rebuild the portion of their packing plant at Sedalia, Mo., recently destroyed by fire with loss estimated at about $125,000.

The Board of Education, Wichita, Kan., is arranging a list of equipment to be installed in the manual training department at the proposed new high school.

The Duncan Lubricant Oil Works, Inc., Duncan, Okla., has been incorporated with a capital of $50,000 to operate a local plant for refining lubricating oils. The company is headed by Roy K. Wilson and J. R. Frensley.

The Gulf States

BIRMINGHAM, July 25.

The Turning Basing Compress Co., 302½ Main Street, Houston, Tex., recently organized, has plans under way for a new cotton compress plant, 100 x 100 ft., with machinery estimated to cost about $100,000. Robert E. Goree is president, and G. M. Edel, secretary.

The Southern Brass & Plating Co., Houston, Tex., is planning to rebuild the portion of its plant recently destroyed by fire.

Fire, July 19, destroyed a portion of the sugar refinery of the Morsihan Sugar Co., New Iberia, La., with loss estimated at about $300,000, including machinery.

The Gibstown Electric Light & Power Co., Gibstown, La., recently organized, is planning for the immediate erection of a new local electric generating plant. E. W. Merritt is president, and J. H. Houck, secretary and treasurer.

The Co-operative Ice Co., Clearwater, Fla., recently organized, is planning for the erection of a new ice-manufacturing plant with initial daily capacity of about 25 tons, estimated to cost about $35,000. F. L. Hendrix is secretary and treasurer.

The Henderson Cotton Oil Co., Shreveport, La., is completing plans and will soon take bids for the rebuilding of its local cottonseed oil manufacturing plant, recently destroyed by fire with loss estimated at about $300,000, including machinery.

The Common Council, Moore Haven, Fla., is planning for the installation of a municipal electric light and power plant. A bond issue will be arranged.

E. G. Edwards, Wetumpka, Ala., and associates are organizing a company to construct a local cold storage and ice-manufacturing plant. Plans will be arranged at an early date.

The Gulf Coast Oil Refining Co., Gulfport, Miss., recently organized, has acquired about 20 acres for the construction of a new plant. George L. Dodds is president and Charles T. Madison, vice-president and general manager.

The State Bond Improvement Co., Jackson, Miss., will break ground at once for a new one- and two-story power plant at the Mississippi Agricultural College, Starkville, Miss., estimated to cost about $50,000.

The Union Sawmill Co., Stamps, Ark., is planning to rebuild its local plant, recently destroyed by fire with loss estimated at close to $1,000,000 with machinery. J. W. Adkins, construction engineer, is in charge; F. W. Scott is general manager.

Motors, oil engines, pumping machinery and other mechanical equipment will be installed by the Board of Aldermen, Amite, La., in connection with extensions and improvements at the local waterworks. Massena L. Culley, Jackson, Miss., is consulting engineer. M. R. Williams is clerk of the Board of Aldermen.

Milwaukee

MILWAUKEE, July 25.

Probably the most encouraging prospect before machine tool builders is the settlement of the Government obligation to railroads in part at least within the coming 30 to 60 days. The release of approximately $500,000,000 into railroad channels is expected to make possible a fairly heavy aggregate of machine tool and general equipment purchases which have been held in abeyance awaiting proper financing. Current inquiry, coming principally from the automotive, textile and shoe machinery industries, is relatively good, but orders are slow in development. July sales of tools so far are at least equal to those of the entire month of June and most makers and dealers expect to show a small gain by the close of the period.

The Tomahawk Steel & Iron Works, Tomahawk, Wis., expects to start work about Aug. 10 or 15 on the erection of a new foundry and machine shop in place of the plant destroyed by fire two months ago. It will be of brick and steel, 100 x 160 ft., with a basement 50 x 60 ft., and is estimated to cost $75,000 with equipment, most of which will require replacement. The new plant will occupy a site on the Chicago, Milwaukee & St. Paul main line. W. P. Ireland, Tomahawk, and L. A. DeGuere, Wisconsin Rapids, Wis., are associated architects and engineers on the project. The Tomahawk company operates as a commercial foundry and machine shop but manufactures special logging and woodworking machinery and specializes in repair work for saw and planing mills and wood-working plants in the lumber region of Northern Wisconsin.

The Meigs-Powell Co., 582-584 Sixteenth Avenue, Milwaukee, manufacturer of gages, micrometers and other precision instruments, sustained a heavy loss by fire which destroyed the adjoining building, occupied by the Max Schuelke Pipe Organ Co., on July 20. It is intended to reconstruct the building at once. Some retooling will be necessary. John D. Powell is secretary and treasurer of the Meigs-Powell Co.

The Biggam Trailer Co., Milwaukee, has been incorporated to manufacture trailers, trailer trucks and similar specialties for the automotive industries, and to license motor truck manufacturers for the production of such units. The capital stock consists of $250,000 preferred stock and 15,000 shares of common stock without par value. The incorporators are H. F. Biggam, Leo G. Smith and Waldemar C. Wehe, attorney, 425 East Water Street, Milwaukee.

The Riverview Foundry Co., Silver Lake, Wis., a new corporation with $10,000 capital, is erecting a one-story building, 50 x 120 ft., which will specialize in jobbing work for agricultural implement and automotive shops and also manufacture stoves. Operations will begin about Sept. 1. The principals are Charles R. Bohrn, R. C. Dixon and E. I. Dixon, all of Silver Lake.

The Cook & Gardiner Sanitary Rake Co., Beloit, Wis., has been organized by W. R. Cook and E. M. Gardiner to manufacture an automatic cleaning lawn rake and other garden tools. The factory of the former Weber Fanning Mill Co., at Rockton, Ill., suburb of Beloit, has been leased and is being equipped. It is two stories, 30 x 80 and 30 x 60 ft., and will be in operation about Aug. 10.

William J. Cary, county clerk, Milwaukee, is taking bids for furnishing the Milwaukee County Courthouse power plant department with one medium duty thread cutting engine lathe and one horizontal piston pattern, simplex design, Burnham high duty boiler feed pumping unit.

The Acme Valve Grinding Machine Co., Milwaukee, has been organized with a capital stock of $25,000 to manufacture special machinery and tools for automotive shops, etc. The incorporators are George W. Leitsch, V. A. Roberts and George A. Fullips, 3507 Chambers Street, formerly superintendent Badger-Packard Machinery Co., Milwaukee.

The Wisconsin State Board of Control, M. J. Tappins, Madison, Wis., secretary, expects soon to call for bids for the construction and equipment of a $60,000 cold storage plant and warehouse in connection with the State prison at Waupun, Wis. The architect is Arthur Peabody, Capitol Building, Madison.

The Brunett Heating System Co., Rice Lake, Wis., recently incorporated with a capital stock of $100,000, has acquired an 80-acre site on the Chicago & Northwestern and Soo Line tracks, for its proposed foundry and machine shop. It will manufacture heating units designed by M. R. Brunett of Minneapolis and adapted especially for farm and rural communities. Construction work will start Aug. 1.

The Valley Paper Mill Co., Neenah, Wis., a new $300,000 corporation, has engaged E. A. Wettengel, architect, Appleton, Wis., to design a one- and two-story brick and concrete mill and power plant, 100 x 300 ft., estimated to cost about $150,000 with equipment. Albert C. Ehlman, 114 Grand Avenue, Milwaukee, is president. George W. Burnside, Neenah, is general manager.

The Oliver Mfg. Co., Milwaukee, which was organized several months ago and is now manufacturing lifting packs and other automotive specialties, has changed its corporate style to the Oliver-Barth Jack Co., to better express the nature of its business.

The J. M. Royal Engineering Co., Milwaukee, has been incorporated with a capital stock of $25,000 to manufacture machinery, specialties, etc. The principals are James M. Royal and Howard A. Schroeder. Emmett J. McLeod, 128 Grand Avenue, is attorney.

The Seamweld Equipment Co., 814 Winnebago Street, Milwaukee, has been organized to manufacture welding equipment, transformers and electrodes under the Fay patent. The officers are Fred Pabst, president; Harry W. Marsh, vice-president and treasurer; P. C. McNulty, Jr., vice-president and general manager, and Joseph W. Fay, vice-president and chief engineer.

California

SAN FRANCISCO, July 19.

The Schartzer Illuminated License Plate Co., West Nineteenth Avenue, Oakland, Cal., manufacturer of metal license plates, has awarded contract to Edward DeMar, 3080 Claremont Avenue, Berkeley, Cal., for its new one-story plant on West Nineteenth Avenue, estimated to cost about $75,000 with machinery.

Weldon & Glasson, Thirty-first Street and Woolman Avenue, San Diego, Cal., operating a wood-working plant, are planning to rebuild their works, destroyed by fire, July 7, with loss estimated at about $75,000, including machinery.

The Hoff Magnesite Co., Monadnock Building, San Francisco, has acquired about one acre of land at San Pablo, Cal., for the erection of a new plant. Preliminary plans are under way.

The Severin Motor Car Co., Kansas City, Mo., manufacturer of automobiles and equipment, is considering the purchase of land at Oakland, Cal., for the erection of a Pacific Coast plant.

The Moore Shipbuilding Co., foot of Adeline Street, Oakland, Cal., has filed plans for a new one-story foundry for the manufacture of brass castings.

The Albany Engineering Works, Berkeley, Cal., is planning for the erection of a new one-story machine shop and foundry.

The Bastian Combination Water Heater Co., Los Angeles, manufacturer of water heaters, etc., has filed notice of change of name to the General Water Heater Corporation.

The Board of Education, Sacramento, Cal., is planning for the purchase of machinery and equipment for manual training work at the local high school to cost about $18,000. A list is being prepared.

The Board of Supervisors, Oroville, Cal., has directed Frank Boyle, County Purchasing Agent, Oroville, to purchase a rock crushing machine with screens, asphalt heating plant, road grader and other equipment for the Highway Department.

Canada

TORONTO, July 25.

Although dealers have been receiving more inquiries than usual the past two or three weeks for machinery and tools only a very few have turned into actual sales and the market continues quiet. Some dealers, however, have been doing a fair business in second-hand tools, but the demand is usually for replacement purposes. Small tools are moving quietly.

The Bell Thread Co., Ltd., Hamilton, Ont., is in the market for a 25-hp., three-phase, 25-cycle, 220 volt motor; also one of 5-hp., three-phase, 25-cycle, 220 volt.

The lumber mill of the Richards Mfg. Co., Ltd., Campbellton, N. B., was destroyed by fire July 19 with a loss of $60,000.

The National Slag Production Co., Hamilton, Ont., has secured a site on the Canadian National Railway and the beach line of the Grand Trunk Railway and will establish a plant. The new concern is capitalized at $300,000 and is headed by Edwin J. Robertson.

The Dominion Oxygen Co., Ltd., is about to start work on the erection of a plant in Montreal to cost $250,000, which will be a duplicate of its Toronto works and double the capacity of the organization.

Republic Company Suffers Deficit for Quarter

Additional evidence bearing on the condition of the steel industry earlier in the year is found in the report of the Republic Iron & Steel Co. for the three months ended June 30 last. This report shows a net operating loss for that period of $508,447, contrasted with a profit of $2,793,687 for the corresponding period last year. Subsequent figures show, after taxes and charges, a deficit of $883,673, as against a surplus of $104,611 for the preceding quarter, or 42c. a share on the company's $25,000,000 preferred stock, and a surplus of $2,305,500, equivalent to $6.22 a share on the $30,000,000 common stock, after preferred dividends, for the like period last year.

This showing, in part, at least, is due to a broad policy in providing for depreciation and renewal charges, amounting to $175,675 for the period just ended, as against $177,797 for the quarter ended March 31 last, as well as increased bond interest charges. The total deficit for the June quarter amounted to $1,321,173; for the corresponding period last year there was a profit of $418,000.

Unfilled orders on the books of the company, as of June 30, were 97,265 tons, as against 121,498 tons for the corresponding period last year.

Based on earnings for the first six months of 1921, the company's surplus, which on Dec. 31, 1920, stood at $37,441,571, has been reduced to $35,337,509.

Great Northern Ore Properties

The total receipts from all sources by the trustees of the Great Northern Iron Ore properties in 1920 were $5,952,816, comparing with $5,844,000 in 1919. A total of $6,000,000 was paid out to holders of certificates of beneficial interest, which represented two semi-annual dividend payments of $2 per share each. The small deficit was charged against the undistributed receipts fund, and at the end of 1920 there was $208,000 left in this fund.

The total number of tons of ore shipped under the old leases in 1920 was 2,423,445, and the average royalty was 15.52c. This compares with a total tonnage shipped in 1919 of 1,824,510, and average royalties of 17.52c. per ton. The 1919 receipts were the lowest in the history of the property since 1911, and the 1920 receipts show only small improvement.

Steel Corporation Taxes

The following statement was made July 22 by Elbert H. Gary, chairman United States Steel Corporation, in response to questions by newspaper men:

In making our income tax returns to the Government for 1917 and 1918, we raised questions concerning items involving approximately $60,000,000 of taxes. Believing these were not taxable, we claimed credit for them in our returns. Recently the Government representatives have been discussing with us the questions relating to these items. They have not been decided nor has any of them been decided. We have no way of determining when a decision will be reached.

IRON AND INDUSTRIAL STOCKS

Low Prices Beginning to Attract More Investment Buying

While the market for securities is by no means active, low prices are beginning to attract more investment buying. For a long period the rank and file have paid more attention to minorities than to majorities; to pessimism than to optimism. That the country is financially sounder and industrially more active than it was a month ago cannot be disputed, and unmistakable signs are developing that strongly suggest greater activity in fundamental trades heretofore suffering from an apathy of the buying public. The increased buying of steel products by the railroads, which are nearer to receiving claim money from the Government than they have been before, is of importance notwithstanding mills are inclined to cut prices for their goods. Such purchasing should form a backlog for the steel mills and it seems logical to assume will encourage industry as a whole to go forward, providing the buying public loosens its purse-strings.

As to the latter, we have increasing savings deposits and a strengthening in cash reserves of National and Federal banks, which mean a huge buying power sooner or later and an ability of industry to borrow funds with which to conduct business. Our indicated and present grain supplies are enormous, the carriers already cracking under the strain of moving them. Packing house interests are selling larger amounts of foodstuffs. Leather, cotton and woolen industries give further evidences of having passed beyond the depression point. Other straws indicate reviving general business the country over.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	30¾ - 32	Gulf States Steel.	30 - 31
Allis-Chalm. pf...	69½ - 72	Int. Har. com.....	72¾ - 75⅜
Am. Can com.....	26 - 27½	Lackawanna Steel.	— - 37½
Am. Can pf.....	— - 81	Midvale Steel.....	22¾ - 23½
Am. C. & F. com.	122 -126	Nat.-Acme	14¾ - 15¼
Am. C. & F. pf...	109½-110	N. Y. Air Brake..	— - 54
Am. Loco. com....	80½ - 84	Press. Steel com..	— - 73
Am. Radiator com.	— - 68½	Ry. Stl. Spg. com.	81 - 82½
Am. Steel F. com.	25⅝ - 26⅜	Ry. Stl. Spg. pf...	— -100
Bald. Loco. com..	73 - 78¼	Replogle Steel....	19 - 19½
Bald. Loco. pf....	— - 97	Republic com.....	44½ - 47
Beth. Steel com..	42 - 43	Republic pf.....	— - 83
Beth. St., Cl. B..	45¼ - 48¾	Superior Steel....	30 - 34¼
Beth. Stl., 8% pf..	98 - 98¼	Un. Alloy Steel...	23⅞ - 25¾
Chic. Pneu. Tool..	— - 50	U. S. Pipe com...	14 - 14⅞
Colorado Fuel.....	26 - 26⅜	U. S. Steel com...	71¾ - 73¼
Cruc. Steel com...	52¾ - 55¾	U. S. Steel pf.....	108⅞-109⅜
Cruc. Steel pf.....	— - 82	Vanadium Steel...	27⅞ - 29¼
General Electric..	117¾-122¼	Va. I. C. & Coke..	— - 70
Gt. No. Ore Cert..	27 - 27½	Westingh'se Elec.	41⅝ - 44⅝

Industrial Finances

The Peck, Stow & Wilcox Co., Southington, Conn., small tools, has called a stockholders' meeting for July 27 for the purpose of electing directors and to vote on accepting an amendment to the company's charter, sanctioned by the Connecticut General Assembly last March, authorizing an increase in the capitalization from $1,500,000 to $4,000,000.

The General Electric Co. offers its employees the privilege of subscribing to new $10 bonds and subscription stamps under a perfected savings plan. The 5 per cent supplementary compensation for continuous service for five years or more, for the first half of 1921, will be paid early in August in employees' 7 per cent investment bonds, issued in denominations of $10. Balances above multiples and amounts less than $10 will be paid as nearly as possible in non-interest bearing employees' subscription stamps in denominations of 50c.

The Westinghouse Electric & Mfg. Co. has filed with the Massachusetts commissioner of corporations a statement of its financial condition dated March 31 last, which shows total assets and liabilities of $196,748,534, contrasted with $146,283,560 at the close of the previous year. During the year there was no increase in the share capitalization of the company, but $30,000,000 bonded indebtedness was created, and a mortgage of $6,275,000 was assumed. The surplus account shows a shrinkage of approximately $1,500,000, standing as it does at $37,000,682.

Directors of the Lincoln Motor Co. are making arrangements for a $2,500,000 bond issue, half of which will be placed within the near future and the remaining half held as a backlog. There will be no public offering of the bonds inasmuch as directors and large stockholders have subscribed for the entire issue to be floated for the present.

The Gulf States Steel Co. operated at a profit of $34,396 during the quarter ended June 30, last. After making deductions for taxes, depreciation and other charges, there was a deficit of $53,353, contrasted with one of $102,917 for the preceding three months period.

The regular quarterly dividend of 1¾ per cent on the outstanding preferred stock of the Taylor-Wharton Iron & Steel Co. for the three months ended June 30, 1922, has been declared payable Aug. 1.

Trade and Office Changes

The Curran Motor Products Co., Detroit, has changed its name to Western Motor Products Co., Inc. It is capitalized at $100,000.

Lasker & Minck have been appointed the Eastern sales agents for the Evans & Howard Fire Brick Co., St. Louis; they have also been appointed sole distributors for Koppax paint in Mexico.

The Economy Baler Co., Ann Arbor, Mich., has sent W. H. Fogelsong, scrap metal press expert, to Cleveland to take charge of the Cleveland office, opened recently at 508 Schofield Building.

W. H. J. Fitzgerald & Co., 165 High Street, Boston, have been made sales representatives in Maine, New Hampshire, Vermont and Massachusetts for the John Steptoe Co., Cincinnati, line of standard lathes.

The W. H. Anderson Tool & Supply Co., Detroit, has leased the property at 303 Bridge Street, N. W., in Grand Rapids, Mich., and will open an office and warehouse there. George D. Bresch has been appointed district manager. The building has been altered and will be ready for occupancy about Aug. 1.

The Oxweld Acetylene Co., Newark, N. J., manufacturer of welding and cutting equipment, has removed the offices of its foreign sales department from Newark to 30 East Forty-second Street, New York. Separate departments for sales, engineering, advertising, shipping and accounting have been established, each in charge of a competent man of long experience in the export field.

The M. J. Dougherty Co., piping fabricator and engineer, Philadelphia, has secured the Tomlinson Steam Specialty Co., Cleveland, Detroit and Akron, to represent it in the upper half of the State of Ohio and all of Michigan.

The Positive Lock-Bolt Co. has purchased the entire assets of the Safety Nut & Bolt Co., Cleveland. The new organization is a $250,000 Ohio corporation with the following personnel: C. C. Murphy, president; J. N. Leatherman, vice-president; M. D. Neff, secretary; Edna B. Craft, treasurer; W. H. Burke, general manager; H. L. Jollay and William F. Koehn, directors. The purchaser will complete equipping the factory, work of which was well under way when the old company met with difficulties, and will proceed within a period of 90 days to manufacture on a quantity basis, not only the lock-bolt, but several other specialties to which the locking device is applied and patents of which we have also purchased.

The Cleveland office of the Sullivan Machinery Co. was moved on July 1 from 810 Park Building to room 824, Kirby Building. Ralph T. Stone is manager at Cleveland. The company has established a supply depot and service station for coal mining machinery supplies and repair parts at Seventh Avenue and Thirteenth Street, Terre Haute, Ind., with H. T. Wiley, formerly of the engineering department at the Claremont, N. H., Works, in immediate charge. This service station will be under general charge of M. C. Mitchell, manager for Illinois and Indiana, at the Railway Exchange Building, St. Louis.

Peter A. Frasse & Co., Inc., machinery, tools, supplies, New York, has been appointed the sole agent for the metropolitan district for the drilling machines made by the Sibley Machine Co., South Bend, Ind.

The partnership heretofore conducted by W. Nelson Mayhew and Samuel Frank, trading under the firm name of Steward & Stevens Iron Works, and the partnership heretofore existing between Joseph N. Dalsen, Samuel Frank and W. Nelson Mayhew, trading as Montgomery Iron & Steel Co., have been merged, and the business heretofore conducted by the Steward & Stevens Iron Works and the Montgomery Iron & Steel Co. will hereafter be conducted by W. Nelson Mayhew, Samuel Frank and Joseph N. Dalsen, co-partners trading as Montgomery Iron & Steel Co.

The first issue of *The Dart*, a house organ published by the Medart Patent Pulley Co., St. Louis, appeared June 1. The articles include a discussion of business conditions and an outline of the development of Philip Medart's process of shafting manufacture. Size 4 x 9 in.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.93c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.93c.
Hoops, base price	4.03c.
Bands, base price	3.63c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.03c.
Channels, angles and tees under 3 in. x ¼ in., base	2.93c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.63c.
Squares, flats and hex	4.98c. to 5.13c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	3.03c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.68c.
No. 12	3.73c.
No. 14	3.78c.
No. 16	3.88c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c.	.....
Nos. 22 and 24	4.35c.	4.70c.
No. 26	4.40c.	4.75c.
No. 28	4.50c.	4.85c.
No. 30	4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.25c. to 4.50c.
No. 16	4.50c. to 4.75c.
Nos. 18 and 20	4.65c. to 4.90c.
Nos. 22 and 24	4.80c. to 5.05c.
No. 26	4.95c. to 5.20c.
No. 27	5.10c. to 5.35c.
No. 28	5.25c. to 5.50c.
No. 30	5.75c. to 6.00c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¾ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap.....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap...	— 7	+4

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.25c. to 4.50c.
Annealed soft	4.25c. to 4.50c.
Galvanized annealed	5.00c. to 5.25c.
Coppered basic	4.75c. to 5.00c.
Tinned soft Bessemer	6.25c. to 6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	19 c. to 20 c.
Copper tube, seamless	22¼c. to 23 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$6.80	$6.55
		90 lb....	6.90	6.65
		100 lb....	7.00	6.75
IC..	$10.60	$9.50	IC...	7.20	6.95
IX..	11.80	10.75	IX...	8.10	7.85
IXX..	13.60	12.25	IXX...	9.10	8.85
IXXX..	15.60	14.25	IXXX...	10.50	10.25
IXXXX..	17.20	16.00	IXXXX...	11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	31c.
Bar	38c. to 40c.

Copper

Lake ingot	16c.
Electrolytic	16c.
Casting	16c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	30c. to 32c.

Old Metals

The market is still very discouraging and buying values are slightly lower. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.00
Copper, heavy and wire	9.25
Copper, light and bottoms	7.75
Brass, heavy	4.75
Brass, light	3.75
Heavy machine composition	8.25
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.50
Lead, tea	2.25
Zinc	2.50